

PROJECT OPERATIONAL PLAN
SMALL-MESH BOTTOM TRAWL SURVEY
OF SHRIMP AND FORAGE FISHES:
KODIAK, CHIGNIK, AND SOUTH PENINSULA DISTRICTS



by

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TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	i
LIST OF FIGURES	ii
LIST OF APPENDICES	iii
ABSTRACT	1
INTRODUCTION.....	2
OBJECTIVES.....	3
METHODS.....	4
Trawl Description and Procedures.....	4
Catch Sampling.....	4
Adult Pacific Cod and Walleye Pollock Haul Sampling	5
Handling the Subsample	5
Groundfish and Invertebrate Subsampling	6
Shrimp Sampling.....	7
Forage Fish Sampling.....	8
Problem Sampling Scenarios	9
Fish Measurements	10
Rock Sole Identification.....	10
Pacific Cod Tagging.....	10
QTC View™ Seabed Classification.....	11
THE DATABASE.....	12
Downloading the Polycorder	12
Entering Catch Data.....	13
Temperature Data Logger	13
Data Forms	14
SURVEY EQUIPMENT CHECKLIST.....	14
Sampling Equipment.....	14
QTC View™ Equipment	15
LITERATURE CITED	16
TABLE	18
FIGURE.....	19
APPENDIX.....	20

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Shrimp biomass indices from the Westward Region Shrimp Fishery Management Plan, 1982.....	18

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Commercial shrimp fishing sections in the Kodiak, Chignik, and South Peninsula Districts of Westward Area J	19

LIST OF APPENDICES

<u>Appendix</u>	<u>Page</u>
A. Station selection methodology and alternative station selection methodology.	21
B.1. Rigging for the 61 foot ADF&G/NMFS small-mesh research trawl.....	22
B.2. General net schematic of the 61 foot ADF&G/NMFS small-mesh research trawl.	23
B.3. Diagram of the wing tips and side panel of an ADF&G/NMFS small-mesh research trawl.	24
B.4. Diagram of the intermediate and codend of an ADF&G/NMFS small-mesh research trawl.	25
B.5. Diagram of the body construction of an ADF&G/NMFS small-mesh research trawl.....	26
C. Skipper trawl record form and shipboard instructions.....	27
D. Shrimp survey region, area, and stratum codes.....	29
E.1. Square mileage table, Kodiak District.....	33
E.2. Square mileage table, Chignik and South Peninsula Districts	34
E.3. Square mileage table for irregular survey stations, Kodiak District	35
F. Haul species composition form and shipboard instructions	38
G. Shrimp length frequency form and shipboard instructions	40
H. Length measurement of pandalid shrimp for the small-mesh trawl survey.....	42
I. Methodology for sexing pandalid shrimp	43
J. Shark, skate, roundfish, and flatfish length frequency measurement	47
K. Data Entry Program and Polycorder Instruction Manual.....	48
L. Pacific Cod Tagging form and shipboard instructions.....	70

LIST OF APPENDICES (Cont.)

<u>Appendix</u>	<u>Page</u>
M. Species list and NMFS Race Division species codes	72
N. Temperature data logger instructions.....	74

ABSTRACT

The Alaska Department of Fish and Game (ADF&G) will conduct small-mesh bottom trawl surveys of waters in the Gulf of Alaska around the Kodiak Island archipelago and adjacent to the Alaska Peninsula. Sample stations will be selected from survey grids and strata that have been utilized since the mid 1970s in the ADF&G shrimp research program. The sampling gear is an 18.6 m high opening research trawl with 3.1 cm stretch mesh throughout the mouth, body, and codend. The three bridle net will be towed for a standard distance of 1.85 km at each site.

The first objective is assessment of the distribution and abundance of pandalid shrimp populations primarily northern pink shrimp *Pandalus borealis*, sidestriped shrimp *Pandalopsis dispar*, and humpy shrimp *Pandalus goniurus*. Population estimates for shrimp will be calculated using an area swept technique and compared with established thresholds to determine the potential for commercial fishery openings. Secondary objectives include determining the species composition of the entire catch in survey hauls, obtaining length frequencies of commercially important shrimp and groundfish, generating relative density estimates for forage fish species and tagging Pacific cod *Gadus macrocephalus* as part of a mark-recapture study.

INTRODUCTION

Shrimp has been commercially harvested around Kodiak Island since 1958 and along the south side of the Alaska Peninsula since 1968. Total landings averaged more than 50 million pounds per year during the 1960s and 1970s. The northern or pink shrimp *Pandalus borealis* comprised greater than 85% of the catch, but humpy shrimp *P. goniurus*, coonstriped shrimp *P. hypsinotus*, and sidestriped shrimp *Pandalopsis dispar* all made significant contributions to the harvest, which was primarily taken with trawl gear (Gaffney 1981). Since 1986 production has averaged less than 10,000 pounds per year (Jackson and Ruccio 2003). Other shrimps taken incidentally include several species from the families Crangonidae and Hippolytidae. Little commercial activity for trawl shrimp has occurred since 1982 as stock abundance and fisheries declined sharply with changing oceanographic conditions (Anderson 2000).

Westward Region research on pandalid shrimp by the Alaska Department of Fish and Game (ADF&G) began in 1968 with a commercial fishery logbook program. The objectives of this program were to establish baseline data on relative stock abundance and define basic life history parameters for the primary species involved in the commercial fisheries (Jackson et al. 1983). The trawl survey stock assessment program began in 1970 to provide directly comparable stock abundance indices and monitor recruitment, growth, and the effects of fishing on the population age structure. The small-mesh trawl designed for shrimp research by National Marine Fisheries Service (NMFS) in the early 1970s is still in use today.

Successive trawl survey indices for a given stock were shown to track relative abundance over time. A management strategy developed in 1979 utilized trawl survey results as the primary data source for determining commercial fishery guidelines. Harvest levels were based on proportions of abundance index thresholds. The management goal was to achieve maximum harvests without affecting reproductive potential. The plan approved by the Alaska Board of Fisheries (BOF) in 1982 detailed biomass indices for 26 fishing sections (Table 1). The minimum shrimp biomass requirements for opening fisheries are still in effect today.

ADF&G conducted spring and fall stock assessment surveys for shrimp during the years when shrimp abundance was high and commercial fishing effort was at its greatest level. As stocks declined and commercial fishing effort decreased, the level of research conducted by ADF&G also decreased. Trawl assessment surveys of shrimp stocks were first reduced from spring and fall surveys to a single fall survey in 1986. Further reductions resulted in the shrimp survey being conducted biennially beginning in 1987 and triennially beginning in 1989 and extending through 2001. NMFS, to extend their Pavlof Bay small-mesh trawl data series and monitor long-term changes of the species community structure in the GOA, funded an additional survey in 2002. More information on previous shrimp trawl assessment surveys is available from the Kodiak ADF&G office in the Regional Information Report (RIR) series.

It has been increasingly recognized that forage fish populations are essential for marine ecosystem health. To that end, the North Pacific Fishery Management Council and the Alaska Board of Fisheries

have prohibited any new directed fisheries on forage fish species. ADF&G has not conducted forage fish research per se, but catch data from prior shrimp or small-mesh trawl surveys has provided important information to other agencies and researchers. Species composition has given insight to the effects of changing oceanographic conditions (Anderson et al. 1997a, Anderson et al. 1997b, Anderson and Piatt 1999).

Perhaps the greatest value of this survey is the continuation of the time series for small-mesh trawl samples. Ecosystem based marine fishery management suggests moving away from a single species approach based on static oceanographic conditions. It is now recognized that effective and sustainable use of resources requires more understanding of ecosystem processes and how they are affected by changing environmental and human influences. A research priority should be regular studies of the marine ecosystem structure in order to judge the effects of those influences. The small-mesh trawl survey series has documented species composition of shrimp and fish in the Gulf of Alaska for over 30 years and will continue to provide important clues for researchers trying to understand the ecology of the North Pacific Ocean.

OBJECTIVES

The first objective of the small-mesh trawl survey is assessment of the distribution and abundance of pandalid shrimp populations, primarily northern pink shrimp, sidestriped shrimp, and humpy shrimp. Population estimates for shrimp will be calculated using an area swept technique (Alverson and Pereya 1969) and compared with established thresholds to determine the potential for commercial fishery openings.

Secondary objectives of the survey are:

- Determine species composition of the catch by haul and area.
- Obtain length frequency distributions for commercially important shrimp and fish species.
- Obtain composition samples of shrimp for each stratum surveyed; analyze each sample for length frequency by sex.
- Compare relative abundance of shrimp to recent and historic survey data to make inferences about population trends.
- Generate density estimates for forage fish species from the areas sampled.
- Floy-tag² Pacific cod captured during the survey as part of an ongoing mark-recapture project to study migration and growth patterns.
- Other marine research objectives on an ad hoc basis. One example is the Quester-Tangent Corporation (QTC)TM seabed echosounder-based classification system used for mapping bottom types. Occasionally, this unit will be deployed during the survey to supplement an ongoing habitat-mapping project being conducted in the Westward Region.

² Use of trade names does not constitute an endorsement by ADF&G.

METHODS

Trawl Description and Procedures

The 27.4 m ADF&G research vessel *Resolution* or a similar chartered fishing vessel will be used to conduct surveys in areas of known shrimp habitat throughout the Westward Region. One tow will be made in each of the preselected stations from plans developed prior to the cruise. Methods have been developed for station selection with protocol for choosing alternate stations if necessary (Appendix A). Bays to be surveyed have been stratified. Strata were initially selected based on productive commercial shrimp fishing areas from the 1960s and 1970s. Consideration was given to depth contours and trawlable habitat. The number of fishing sections surveyed and the intensity of sampling effort will be dictated by budget considerations.

A high opening box trawl with three bridles developed by NMFS and adopted as the standard for shrimp trawl research by NMFS, ADF&G, and Department of Fisheries and Oceans of Canada (DFO) is utilized. This has been the standard net used by these organizations for shrimp trawl survey work since 1973 (Watson 1987). This net has an 18.6 m footrope with a 17.0 m tickler chain suspended by 29 cm dropper chains. The trawl is attached to Astoria semi-vee trawl doors with three 18.2 m dandyines of 1.8 cm diameter (Appendix B.1.). The Astoria semi-vee trawl doors weigh 340 kg each and measure 1.7 m by 2.7 m. Net flotation is achieved by using twenty-nine 16.6 cm floats. The net is constructed with 3.1 cm stretch mesh through the mouth, body, and codend. Electronic net measurement systems and scuba observations have shown this net opens an average of 9.8 m in width and to a height of 4.0 m. Net schematics are provided in Appendices B.2. - B.5.

At each station, the trawl is towed on the bottom at a speed of 3.7 km/hr for a distance of 1.85 km. Total distance towed will be recorded by a Differential Global Positioning System (DGPS). Catch results will be standardized to 1.85 km when distance trawled is longer or shorter than 1.85 km. On rare occasions, the vessel captain will be required to estimate corrections for tows that are not straight. Trawl placement within selected stations will be determined by depth contours, trawlable substrate, and in some situations, weather. All tows will be made during daylight hours. Location, towed distance, depth, time, and related items will be recorded on the Skipper trawl record form (Appendix C). Any deviation from the established protocol in stations towed, or notable gear performance will be recorded in the comment section of this form. Survey region, area, and stratum codes for use on the form are provided in Appendix D. Area considered shrimp habitat for each station is summarized in Appendices E.1. – E.3.

Catch Sampling

The total weight of the catch from each tow is determined by weighing the codend of the trawl with an electronic crane scale accurate to ± 2.0 kg. After dumping the catch from the trawl net, a tare weight for

the empty codend is also determined and recorded. The total haul weight will be the difference in these two numbers unless the haul is too big to be weighed or rough weather does not permit accurate weighing. In these instances, the total weight of the catch will be estimated. Estimations will be the responsibility of the crew leader and vessel captain. The total weight of the catch is recorded on the Haul Species Composition form (Appendix F).

The entire haul will be sampled for selected species; these animals will be weighed (± 0.1 g), counted, and measured (± 1.0 mm) (i.e. whole-hauled). The following species are whole-hauled; sablefish *Anoplopoma fimbria*, Pacific cod, walleye pollock *Theragra chalcogramma*, Pacific halibut *Hippoglossus stenolepis*, all rockfish *Sebastes* spp. and *Sebastolobus* spp., lingcod *Ophiodon elongatus*, octopus *Octopus dofleini*, salmon *Onchorhynchus* spp., weathervane scallops *Patinopecten caurinus*, *Bathyraja* sp., longnose skate *Raja rhina*, big skate *Raja binoculata*, Dungeness crab *Cancer magister*, Tanner crab *Chionoecetes bairdi*, red king crab *Paralithodes camtschaticus*, brown box crab *Lopholithodes formaminatus*, spiny dogfish *Squalus acanthias*, Pacific sleeper shark *Somniosus pacificus*, salmon shark, *Lamna ditropis*, and giant wrymouth *Cryptacanthodes giganteus*. Weathervane scallops caught on the trawl wires are not included in the sample.

The weights of all the whole-haul species are recorded on the Haul Species Composition form. For whole-haul species that are only measured and weighed (groundfish, sharks, and crabs), numbers of individuals are recorded from the measurements. The non-measured whole-haul species (octopus, giant wrymouth, box crab) are counted. Weights of Pacific halibut and skates are determined from length-weight conversions. Total counts of weathervane scallops are also recorded on the Haul Species Composition form.

Adult Pacific Cod and Walleye Pollock Haul Sampling

Every effort should be made to sample the entire haul for adult or mature Pacific cod and walleye pollock. Occasionally abundance will be too high and subsampling is required. One method is a shortcut whole-haul. After filling 4-5 baskets each of Pacific cod and walleye pollock for weighing and measuring, the remainder in the sorting bin can be counted over. The average weight will be calculated from the measurements and applied to the remainder counted over. The additional calculated weights are recorded on the haul species composition form under the whole haul weight column. When walleye pollock are too abundant to count over, the number of fish in the subsample split are sufficient (~50 fish) to characterize the weight, number, and size of fish in the haul. Explain how the sample was handled in the *percent* column of the Haul Species Composition form. If fish were counted over and total weight derived from the average weight put a “Y” in the 100% column. If fish were sampled solely from the subsample split put a “N” in the 100% column. The Access database will extrapolate the estimated number and weight for the species based on the percent in the subsample compared to the total codend weight. This scenario needs to be clearly documented on the Haul Species Composition form.

Handling the Subsample

A 1.5 m² splitting net is used to obtain a subsample of the shrimp, forage fish, and other animals in the catch. Species composition of this subsample is extrapolated within the survey database to weights in the entire catch. The net is tied into the sorting bin before the catch is dumped from the codend. It is then cinched up and a subsample is craned over to the sorting table for sorting and weighing by species.

Groundfish and Invertebrate Subsampling

All groundfish and invertebrates from the subsample will be speciated, weighed, and enumerated. Length frequency data will be taken from commercially important groundfish, crabs, and forage fishes. The commercially important groundfish consist mostly of flatfishes such as arrowtooth flounder *Atheresthes stomias*, starry flounder *Microstomus pacificus*, flathead sole *Hippoglossoides elassodon*, butter sole *Pleuronectes isolepis*, rex sole *Errex zachirus*, Dover sole *Microstomus pacificus*, English sole *Pleuronectes vetulus*, sand sole *Psettichthys melanostictus*, northern rock sole *Lepidopsetta polyxytra*, southern rock sole *Lepidopsetta bilineata* and Alaska plaice *Pleuronectes proboscideus*. Additional fish measured for length frequency include those species listed in the whole haul sampling section. Enumeration will occur automatically as animals are recorded with the polycorder. The remaining portion of the same species subsample not measured will receive an estimated number in the survey database based on average animal weight. The target number of animals to be sampled *per species group* is 50. See the section ‘fish measurements’ below for additional information.

Miscellaneous fish and invertebrates are speciated as thoroughly as possible, although time constraints occasionally require grouping of some species (i.e. sponges, brachipods, clams, sea pens, anemones, hermit crabs, urchins, worms, and polychaetes). Shrimp species may remain grouped at this point if there is more than 3-4 kg. The cruise leader should work to insure as many species as possible are positively identified, especially the starfish, snails, sea cucumbers, sea urchins, and sculpins. See Appendix G for a current species list or consult the NMFS RACE division species code book. Garbage, kelp, empty shells, etc. are lumped into the “debris” category and weighed. **All animals should be returned to sea as soon as possible.**

The platform scale should be tared using the proper size basket or tray before sampling begins. When there are multiple baskets of a fish species, only a representative sample of the catch is measured but all are weighed to the nearest 0.1 g. Any mud should be rinsed off prior to weighing. There is a tendency to pick out larger fish from the subsample first, so the first few baskets may have larger fish while the later baskets have smaller fish. **It is important to measure a representative sample of the catch.** The best method is to take that entire species from an area of the table and mark it for measuring. Otherwise, mix the fish from several baskets to draw one to measure from. Consult the cruise leader before discarding fish to ensure that weights and length frequencies have been taken.

Baskets of fish that are weighed but not measured are recorded in *non-measured subsample weight* column on the Haul Species Composition form. The baskets of fish weighed and measured will be

recorded in the *measured subsample basket weight* column. Record the number of each species in the *count* column of the Haul Species Composition form if possible. If the species is whole-hauled, a “Y” should be recorded in the *100%* column. If a species is subsampled record a “N” in the *100%* column. Errors in entry have been made because abbreviations of the species name have been recorded on the Haul Species Composition form. When in doubt of the short form for the species, write out the full name of the species.

Shrimp Sampling

If there are less than 3-4 kg of shrimp in the subsample, all should be speciated, weighed, and counted. The primary pandalid species, northern pink, sidestriped, coonstriped, and humpy shrimp will be measured. If there is more than 3-4 kg of shrimp in the subsample a shrimp species composition sample is drawn from the subsample and examined. The goal is establish a subsample weight for each species present. Draw about 2 kg of shrimp from the subsample to determine composition. Speciate all shrimp and record the weight and numbers on the lower part of the Haul Species Composition form. Calculate a subsample weight for each shrimp species from this information. Directions for completing the calculations are provided in the haul species composition form instructions. *Shrimps of the Pacific coast of Canada* (Butler 1980) is the recommended taxonomic guide for identification. For shrimp with large numbers in the composition sample it is easier to derive the subsample number using an average weight calculated on the length frequency form.

Length measurements are recorded from the four primary pandalid species in the composition sample on a Shrimp Length Frequency form (Appendix G). Two hundred (200) randomly selected individuals of the dominant species within the station catch, typically northern pink shrimp, is the target sample size. Also, measure the other primary pandalid species from the shrimp composition sample. It is usually not practical to measure more than about 300 shrimp total from each haul so do not increase the sample size of the less abundant species unless ample time is available. If time is available up to 200 randomly selected individuals of those species retrieved from the sorting bin or remainder of the subsample could also be measured. Weigh the measured shrimp and record on the Shrimp Length Frequency form.

If insufficient numbers of shrimp occur in the subsample split for 200 measurements, it may be necessary to retain additional shrimp from the entire catch for the length frequency sample. The cruise leader will need to assess this situation after the subsample split is obtained and prior to discarding the remaining catch. If additional shrimp are taken from the whole haul sample for length frequency sampling be sure there is a random collection. Do not include these extra shrimp in the subsample catch weight, but do include them in the shrimp length frequency weight. Shrimp measurements are made to the nearest 0.5 mm from the right eye socket to the midpoint on the posterior margin of the carapace (Appendix H).

A composite sample of shrimp from each stratum will be preserved in ethyl alcohol to be sexed later in the laboratory. The composite should include a proportional amount of all species of shrimp caught in each station within the strata. (i.e. if there are four stations in a stratum and their shrimp catches are roughly the same; the composite sample should consist of 25% of the shrimp from each tow.) This is best achieved by setting aside a portion of the shrimp caught from the entire catch on each station. The

amount of shrimp set aside from each station in the strata should be roughly proportional to the total volume of shrimp in the haul. Generally, about 1 to 10 kgs of shrimp are saved from each haul for this composite sample. These can be the shrimp used in the subsample and length frequency sample, but does not have to come from those samples. In some cases when shrimp catches are very small, the composite sample will need to come from the unsorted whole haul catch. When strata sample collections take multiple days to complete, care must be taken to place a portion of shrimp in ethyl alcohol each night to stop the decomposition process. One-gallon composite samples are drawn from a mix of all the shrimp saved from all stations in the strata. Sample jars should have a label inserted that contains the date completed, strata name or number, and cruise number. Please place labels in the jar and do not write on the jar lids; this will eliminate confusion when jars are reused in future surveys. A goal of 300 shrimp in each strata composition sample will be sorted, sexed, measured, and weighed in the laboratory (Appendix I).

Forage Fish Sampling

Forage fish will receive more emphasis in future surveys. If practical, forage fish species will be whole-haul sampled (i.e. 100% sampled). In most cases, far too many fish will be captured in the tow for a whole haul sample to be taken. In this scenario, only the forage fish species in the split net or subsample will be sorted to species, enumerated, weighed, and measured. The forage fish from the subsample will be used to estimate the total number and weight in the entire catch. Therefore, it is important for the cruise leader to confirm that the subsample is representative of the entire haul. The target sample size for length frequencies will be 50 forage fish. Similar to the less abundant shrimp species additional specimens may be collected from the whole catch if too few appear in the subsample to meet the length frequency goal. Be sure these extra fish do not appear as part of the subsample weight in the haul record. The length frequency sample should be representative of the fish sizes captured in the tow.

Forage fishes include the following species found in near-shore waters covered by the small-mesh survey: capelin *Mallotus villosus*, eulachon *Thaleichthys pacificus*, Pacific sand lance *Ammodytes hexapterus*, gunnels Family Pholidae, prickelbacks Family Stichaeidae, and Pacific sand fish *Trichodon trichodon*.

Pacific herring *Clupea pallasii*, was not included in the regulatory actions taken by the NPFMC and BOF for forage fishes. However, herring will be included in the sampling protocols established for forage fish because herring has been determined to comprise a portion of Steller sea lion diet (Kruse et al. 2000). The State of Alaska manages Pacific herring in both state and federal waters. Krill, Order Euphausiacea, which is also listed as a forage fish, will have weights recorded on the Species Composition form, but will not be enumerated or measured for length.

Problem Sampling Scenarios

The splitting net does not always pick up **a representative sample**. Therefore some of the catch may need to be shoveled into the subsample. This may be particularly true in situations where there are many juvenile fish mixed with shrimp or large catches of adult groundfish and relatively few shrimp. The cruise leader will supervise this procedure to assure a representative sample is taken.

The catch may be **too large** to weigh on the crane scale and an estimate may be required for the catch. Consult with the skipper. When the **total catch is small** (less than approximately 300 kg), it is faster to sort the entire catch rather than subsample. However, the shrimp net is capable of catching thousands of juvenile fish, subsampling may be necessary even at low weights. Again, the cruise leader will make the determination if the total catch will be whole hauled (100% sampled) or subsampled.

Large pieces of debris may be caught in the trawl (i.e. trees, tubeworms, discarded fishing gear etc.). These items should be whole-haul sampled and weighed separately from the rest of the catch using a splitting strap. Large sharks should also be handled this way.

Mud tows can be a problem for subsampling. The weight of the mud needs to be estimated if it makes up the majority of the subsample. Weigh the entire subsample with the mud in the splitting net. Rinse the mud and weigh the rest of the subsample to establish the proportion of mud in the total catch. The shrimp net does not routinely encounter 'mudding-down' but it is possible.

Juvenile fish and forage fish may be caught in very large quantities in the shrimp survey. It is important that care be taken in distinguishing walleye pollock, Pacific cod, and tomcod juveniles as well as small herring, sandfish, eulachon, and capelin. When large numbers of juvenile and forage fish are caught, these fish can be subsampled while adult fish of the same species are whole-haul (100%) sampled. When subsampling juveniles and forage fish, the measured and unmeasured portion of the sample must be weighed and recorded on the haul species composition form.

Occasionally, **unidentified animals** occur in the survey. If the crew and cruise leader are not able to positively identify the animal in question, take photographs and save the specimen in the freezer taking care to label the date, tow, and cruise number. Further investigation in the laboratory after the survey may be necessary.

Any deviations from the standard sampling procedures should be explained on the haul species composition form.

Fish Measurements

All commercially important groundfish species are measured. Groundfish and sharks are measured from snout to the fork or mid-point of the caudal fin, and skates are measured along the dorsal surface from the tip of the nose to the anterior notch of the pectoral fin. See Appendix J for details.

Most of the measurements are recorded on a polycorder electronic recording device (Appendix K). A minimum of 50 fish from a uniformly sized sample should be measured, but more fish should be measured when the lengths in the sample are variable. One hundred fish from a sample with a mix of sizes (and ages) is not unreasonable. Remember that it's the number of fish and not the number of baskets that's important. The cruise leader may adjust the number of animals measured or the species included in the length frequency sample, however, deviation from the established protocol should not occur without authorization from the cruise leader.

Pacific halibut and skate lengths taken without a polycorder should be recorded on the Haul Species Composition form and entered into the polycorder before downloading to the computer in the dry hold. If halibut measurements are recorded directly onto the polycorder, explain this on the haul form. Avoid scratching or damaging the polycorder stripes by lifting the rough-scaled fish (i.e. starry flounder) instead of sliding them across the board. Scratches, debris, and direct sunlight may inhibit the wand from reading the bar codes on the stripes.

Rock Sole Identification

Northern and southern rock sole will be differentiated according to characteristics defined by NMFS (Orr and Matarese 2000). The blind side skin on the southern rock sole is more transparent and the abdominal muscle pattern is clearly visible. The gill rakers of southern rock sole are more stout and blunt than northern rock sole gill rakers. Counts are 6-10 gill rakers per side on southern rock sole and 10-14 on northern rock sole. Fish with 10 gill rakers are sorted by blind side skin characteristics. Small fish (less than 20 cm) are difficult to identify and are entered as unidentified rock sole in the database.

Pacific Cod Tagging

A Pacific cod tagging program was initiated during the 1997 survey to study migration and growth patterns, and to help identify inshore and offshore populations. The goal is to tag at least 5-10 Pacific cod per haul. Only select Pacific cod that are in good condition (i.e., not bloated, distended, or with open wounds). Very small fish should be avoided as well. A fluorescent spaghetti tag is threaded into a tagging needle and sewn through the base of the dorsal fin, then the tag ends are fastened together. Use tags in sequential order and be careful not to go too deep into the fish's back. Gentle handling and quick release are key to good survival. Size, tag number, and release location are recorded on the Pacific Cod Tagging form prior to release (Appendix L). **These forms need to be rinsed and dried before being stored permanently; in the past these forms have been far too grimy for data entry.** All Pacific

cod lengths should be entered into the polycorder before downloading, using code 99. Tagged Pacific cod will be entered as a separate category into the database from the weighed cod. The weights of the tagged Pacific cod will be estimated from length-frequency tables.

QTC ViewTM Seabed Classification³

A new addition to the survey is the deployment of the QTC ViewTM system, which records the echo waveforms from the vessel's echosounder. The waveforms are then classified into groups, which correspond to different bottom types (QTC 1998). Ground-truthing with video camera and sediment grabs is a key part of acquiring valid data. The system is deployed opportunistically on the vessel when available. The "blue box" is bolted to the back of the monitor stand in the wheel house which is hooked into the echosounder transducer, a computer with the CAPS and DACS software installed, and the DGPS.

Ensure that all connections have been made, the cables are clearly labeled, and the serial cable is split, running from the serial port on the blue box to the serial port on the computer and the DGPS. The transducer cable is permanently installed in the wheel house and is wired into the transducer feed at the junction box to the echosounder and runs to the transducer port on the back of the blue box. The power cable connects to the transform and 110 VAC power source. Always use protected UPS power for the system.

Currently the system is deployed in the calibration mode only as we assess the variability of bottom types found in the survey area. The system is turned off and on every day. Every morning open the CAPS program from the icon on the desktop. Check the raw waveform from the file menu, watching for stray spikes caused by interference with other electronic gear and insuring that there is only a single spike, which is above 2 on the Y-axis, and at the proper depth which is registered on the X-axis. The rest of the waveform should be near the X-axis. The system parameters should be set and stable throughout the survey, with a base gain of 12 kHz and a minimum depth of 10 meters shallower than the minimum depth to be encountered, although zero meters can be used.

Select Start from File>Calibration menu, naming the file for the date, (i.e., 20Jun00). Press Start to begin the calibration. Records should begin to accumulate, about 1 per second. Sometimes if the signal is interrupted from the transducer because the bottom is too soft, the system will stop accumulating records, so check periodically through the day to ensure it is still running. There are three lights on the front of the blue box; 1. "Trig" indicating transducer signal in, 2. "Clip", indicating clipping of the signal meaning that the gain needs to be lowered if it lights more than occasionally, and 3. "Data" indicating that data is being transmitted to the computer. Check either that the trig and data lights are flashing or that records are accumulating on the computer screen to ensure the system is working.

³ Use of this trade name does not constitute an endorsement by the Alaska Department of Fish and Game.

Calibration creates two files, the .ffv and .cat. They grow at about 3 MB per hour. Always check the computer hard drive at the beginning of the day to make certain there is enough storage space. Download onto a zip disc as required. Do not rename the files.

The echosounder should not be run during heavy seas! When the boat has an excessive roll, the echosounder can clip or miss the return signal resulting in misinterpreted data. Therefore, the QTC View™ should be shut off during heavy weather.

THE DATABASE

Information from the survey is stored in a Microsoft Access database developed by NMFS. Prior to data entry, vessel, and cruise settings must be updated. On the Master form click Edit, then Update Vessel/Cruise (e.g. 0302 for year 2003 cruise number 2). Click done after corrections are made.

After each haul all data will be entered and downloaded into the database on the shipboard computer. After all the fish lengths have been entered into the polycorders they are downloaded to the computer. Don't forget to record Pacific halibut, skate, shark, and tagged Pacific cod lengths into the polycorder before downloading. Polycorder species codes and the survey catch data species codes are those used by NMFS Resource Assessment and Conservation Engineering Division (Appendix M).

After starting the computer, select the data entry icon. Access will load and open the database. When the Master menu opens, the data can be entered. Fish lengths from the polycorder are entered first after selecting that option from the master menu.

Downloading the Polycorder

Do not start the polycorder transfer until the yellow colored Downloading Polycorder form appears on the PC screen. Click OK. Connect the RS-232 cable to the polycorder and to the computer. Select the Transfer Data menu and wait for the Transmit Type? prompt. Transmit type is 0 (standard). Press Enter on the polycorder. The data will scroll past on the polycorder. The program will ask you if you want to download another polycorder. If you are done select N and the data will print out. Do not delete the data from the polycorder until the data has printed out and been checked. Make sure that the counts of each species make sense and that there are no abnormal lengths. If you find problems, select Edit button and make corrections then exit Edit. The length summary form will come up after exiting so double-check any changes made. File the printout in a binder for the survey. To erase data for the next haul. Go to the length menu, go into erase data option Shift Y (on the 3 key) and answer the question Sure? There will be a series of beeps and the data will be erased permanently. Go to Menu and type in the next consecutive haul number.

The polycorder's batteries should be checked frequently. To test, insert the Battery Tester RS-232 port onto the polycorder. Press 4, check battery on main menu. The maximum voltage is 8.4 volts. Recharge the polycorder when voltage drops below 6.8 volts. Let the battery drain as much as possible before recharging. This is usually 1-3 days of service.

Entering Catch Data

After pressing the Enter Catch button and entering a haul number, Microsoft Access calculates the estimated weights of measured species from the length data and opens the Catch Entry form for data entry. The program prompts for Subsampling Code. Sometimes the haul will be 100% sampled, Code 1, but typically there will be a subsample of each haul (Code 2). Choose for different proportions sampled. Enter the total weight of the catch recorded on the haul species composition form.

Weights and counts for individual species are entered into the program from the haul species composition form. Open the Species List by clicking on the down arrow from the Species List Combo box. Entering the first few letters of the species will activate the list. Enter the weights in the appropriate column, usually the subsample weight column. If there is a *non-subsampled weight*, click the button above this column or hit F12 key. To enter *multiple basket* weights, click the Multiple Baskets button. In this mode a window pops up and multiple weights can be entered. Hit enter on a blank line to close the basket form. Enter N for species that are subsampled and Y for species that are whole-haul sampled. The program automatically estimates weights for all fish lengths entered. For halibut, skates, and tagged Pacific cod enter the weight calculated by the computer since these species are not weighed on deck. If there is a large difference between the measured and calculated weights, the computer prompts for a new entry. If no errors have been made, measured weight is preferred to the estimate. To delete a species entry, highlight the species column and press Escape (Esc). Once everything is entered, select Print, Save, and Quit. Return to the main menu. Check over the printout for errors and omissions before filing in the binder. Add species and weights to the Haul Species Composition form if the information in the database came solely from the polycorder. Examples are tagged Pacific cod and perhaps small halibut or skates. Check the Entry box on the bottom of the form when entry is complete.

It's a good idea to back up or copy the database onto a zip disk every couple of days during the cruise. Also at the end of each leg the data is backed up on zip disk or copied from the data folder to a zip disk. Run the backup process twice for duplicate sets of disks for safety.

Temperature Data Logger

A data logger records temperatures during each haul. The logger is attached to the headrope of the net and records water temperature, approximately 2 meters off the bottom. Each tow averages 20 minutes and records a temperature every 5 minutes. At the end of each day, temperature data is downloaded to the laptop computer. Open the computer program supplied with the equipment before plugging the data logger into laptop or the logger will not register. A minimum of five temperature readings is

recorded. The first and the last readings can be discarded because the probe is in motion. Average the 2 middle temperature readings and record it on the skipper trawl record form. See Appendix N for detailed instructions on downloading files from the data logger to the laptop.

Data Forms

It is the responsibility of the cruise leader to ensure that all the forms are completed and removed from the boat after each leg of the trip. Copies of fish length frequencies and catch reports should be kept with the Haul Species Composition form and filed in a 3-ring binder. Skipper Trawl Record, Shrimp Length Frequency, and Pacific Cod Tagging forms may be grouped separately and ordered by haul number. All data should be turned over to the project leader directly. This will prevent lost data.

SURVEY EQUIPMENT CHECKLIST

Sampling Equipment

2 crane scales, extra charged batteries, charger	Dandylines and cables
Shackles, swivels, hammerlocks, rings	Nets – 3-5, small-mesh survey nets
Astoria trawl doors – 2 pair	Mending twine and needles
Sampling table	Bin boards
25 fish baskets	25 white plastic sorting containers
3 fish shovels	Temperature Data loggers - 2, AA batteries, plastic tubes (holders)
Fish measuring boards	blue board with code strips
tagging board	Polycorders - 4
Polycorder wands – 10	3-4 extra polycorder measuring strips, brass tracks
Spaghetti tags and needles	Board for holding needles with the tags
Platform scales for large and small baskets	Calipers – at least 3, small and large
Flexible measuring tapes – 3 or 4	Knives - victornox
Scissors	Forceps
2 Laptops, Compaq and Micron	Zip drive
Disks – 3½ inch floppy, 3 zip disks pencils	Binders to hold data forms
Hole punch	3-4 reams of paper
Video camera and tape	Digital camera and 3 ½ high density disks
Monopod for camera	Pacific Cod Tagging Forms
35mm camera, film	Skipper Trawl Record Forms
36 Nalgene composite jugs	Haul Species Composition Forms Shrimp Length Frequency Forms

10 gallon bucket of Ethyl Alcohol	NMFS RACE Species code book
Project operational plan	Species identification books:
Alaska's Saltwater Fishes and Other Sea Life – Doyle Kessler	Guide to Northeast Pacific Rockfishes – Donald Kramer and Victoria O'Connell
Guide to Northeast Pacific Flatfishes – Donald Kramer, William Barass, Brian Paust, Barry Bracken	Pacific Fishes of Canada – J.L. Hart Shrimps of the Pacific Coast of Canada- Butler, T.H.
Survey Charts with current station plans	Printout of last survey stations, date, starting and ending position, latitude/longitude, heading, shrimp catch
2 Lunch-box computers	Oki-data printers, power cable, connector to PC, spare ink cartridges
RS-232 connector (polycorder to PC for downloading)	Recharging polycorder adapters –3/4
Power-pack battery backup (UPS)	Surge protectors
Calculators	Clip boards
Ziplocks for polycorder	Rubber bands

QTC ViewTM

QTC View TM	Laptop computer
Power supply cable	HD disks and zip disks.
Computer serial cable to connect QTC and PC	Transducer cable to connect QTC to transducer

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Table 1. Shrimp biomass indices from the Westward Region Shrimp Fishery Management Plan, 1982.

District	Section	RBI ^a	MABI ^b
Kodiak	Kiliuda Bay	13.20	5.30
	Two Headed Island	18.20	7.30
	Ugak Bay	10.00	4.00
	Alitak Bay (Strata 2)		
	Pink Shrimp	5.30	2.12
	All species	10.70	4.28
	Alitak Flats (Strata 3)	7.00	2.80
	Marmot Island	63.90	25.60
	Inner Marmot Bay	9.10	3.64
	Chiniak Bay	3.61	1.45
	Uganik Bay	6.46	2.59
	Uyak Bay	7.98	3.19
	Wide Bay	2.61	1.05
	Puale Bay	2.98	1.19
Chignik	Chignik Bay	11.37	4.55
	Kujulik Bay	9.45	3.78
	Mitrofanina Island	12.90	5.16
	Ivanof Bay	14.25	5.70
	Chiganagak Bay	1.72	.69
	Aniakchak Bay	7.20	2.88
	Nakalilok Bay	2.04	.82
	Kuiukta Bay	4.76	1.90
South Peninsula	Stepovak Bay	57.97	23.20
	Unga Straits	18.80	7.52
	West Nagai	16.47	6.56
	Beaver Bay	10.90	4.36
	Pavlof Bay	45.30	18.12
	Morzhovoi Bay	26.80	10.72

^aRepresentative biomass index (million pounds)

^bMinimum acceptable biomass index (million pounds)

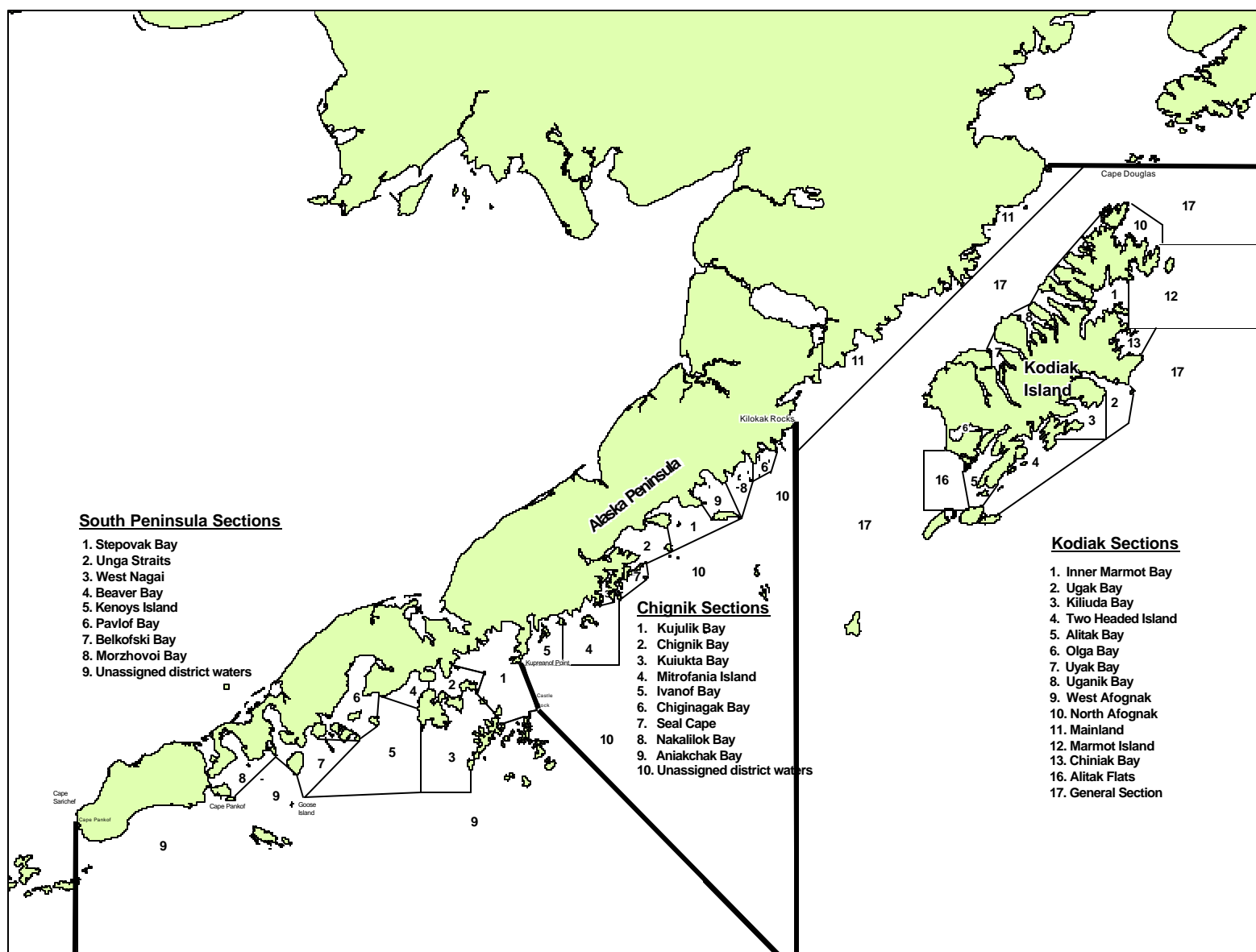


Figure 1. Commercial shrimp fishing sections in the Kodiak, Chignik, and South Peninsula Districts of Westward Area J.

APPENDIX

To select stations, management staff will consider what bays and strata are to be included within the survey. This will depend on the current budget situation and subsequent vessel time available. Consideration may also be given to anecdotal reports of increased or decreased shrimp abundance from other commercial fisheries in the area, preservation of a time series of data, or interest in assessing new areas. This can help maximize effort if the survey has to be conducted over a short time frame or if budgetary constraints prohibit covering a large area.

Except for the smallest of bays, each survey area will consist of one or more strata. These strata are further broken down into blocks of stations; blocks contain 4 stations each. One station will be selected at random from the station blocks (1 station out of the grouping of 4). This will help insure uniform distribution of tows through the survey area. Maps will be prepared prior to departure date.

Alternate station selection

Because the stations are preselected on a random basis, from time to time this will result in selecting stations to tow that do not have sufficient trawlable bottom or cannot be towed because of stationary fishing gear. Randomly select another station from within the same four-grid block. If all four stations prove to be untrawlable (based on low speed soundings of the areas) the entire block may be dropped from the survey. Attempts should be made to make another tow within the same strata (double up in a four-block grid) or within the same bay if there is an insufficient number of stations within the same strata from the untrawlable block.

Dropping stations on survey

Occasionally, stations may have to be dropped under special circumstances. Sometimes weather and logistics force changing prioritization of survey stations or even areas. The cruise leader may choose to drop stations after consulting the vessel captain and area shellfish biologist if it appears not all of the planned work can be achieved.

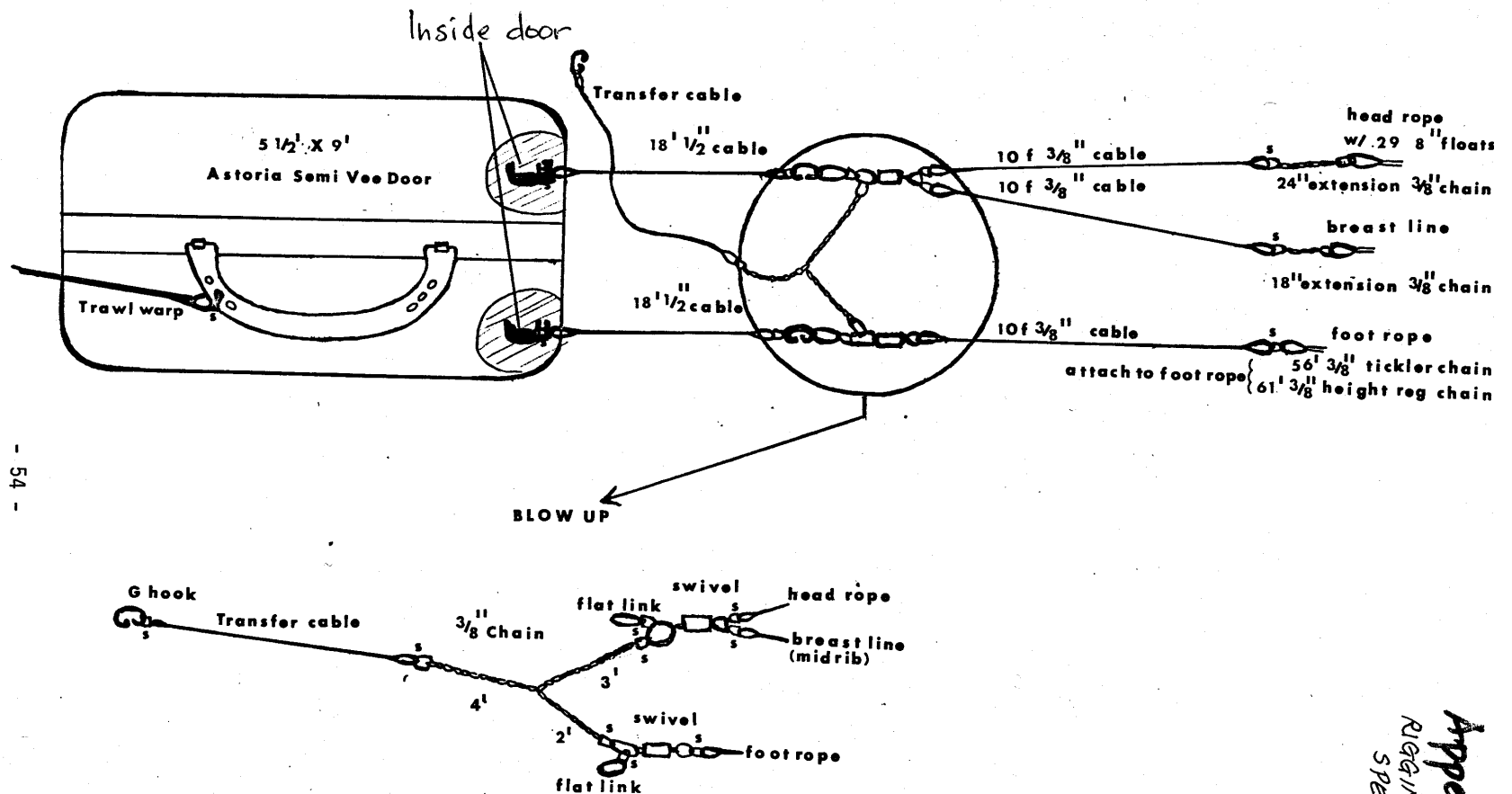
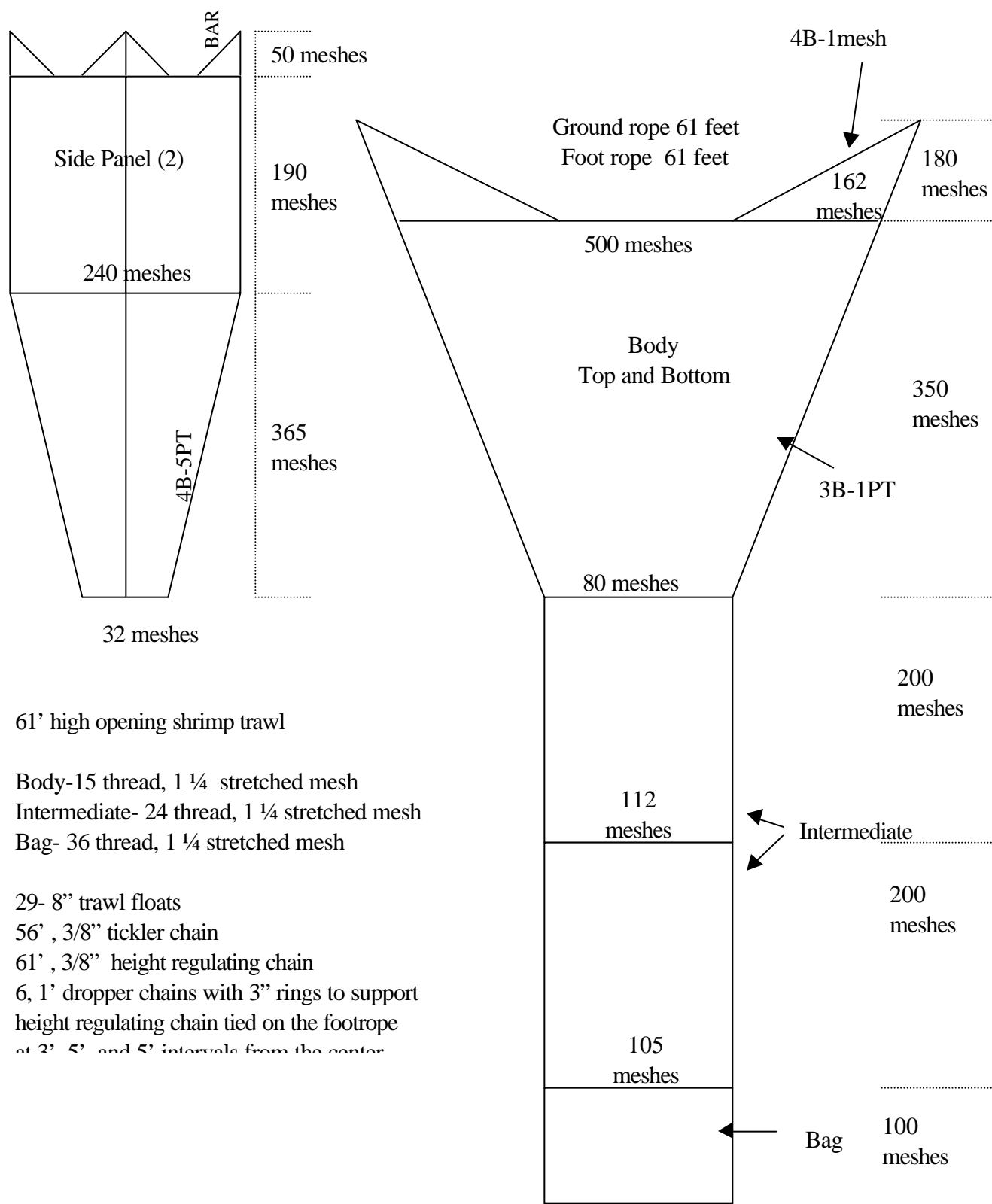


Fig12 ADF&G Westward Region Rigging For The 61' NMFS Shrimp Trawl

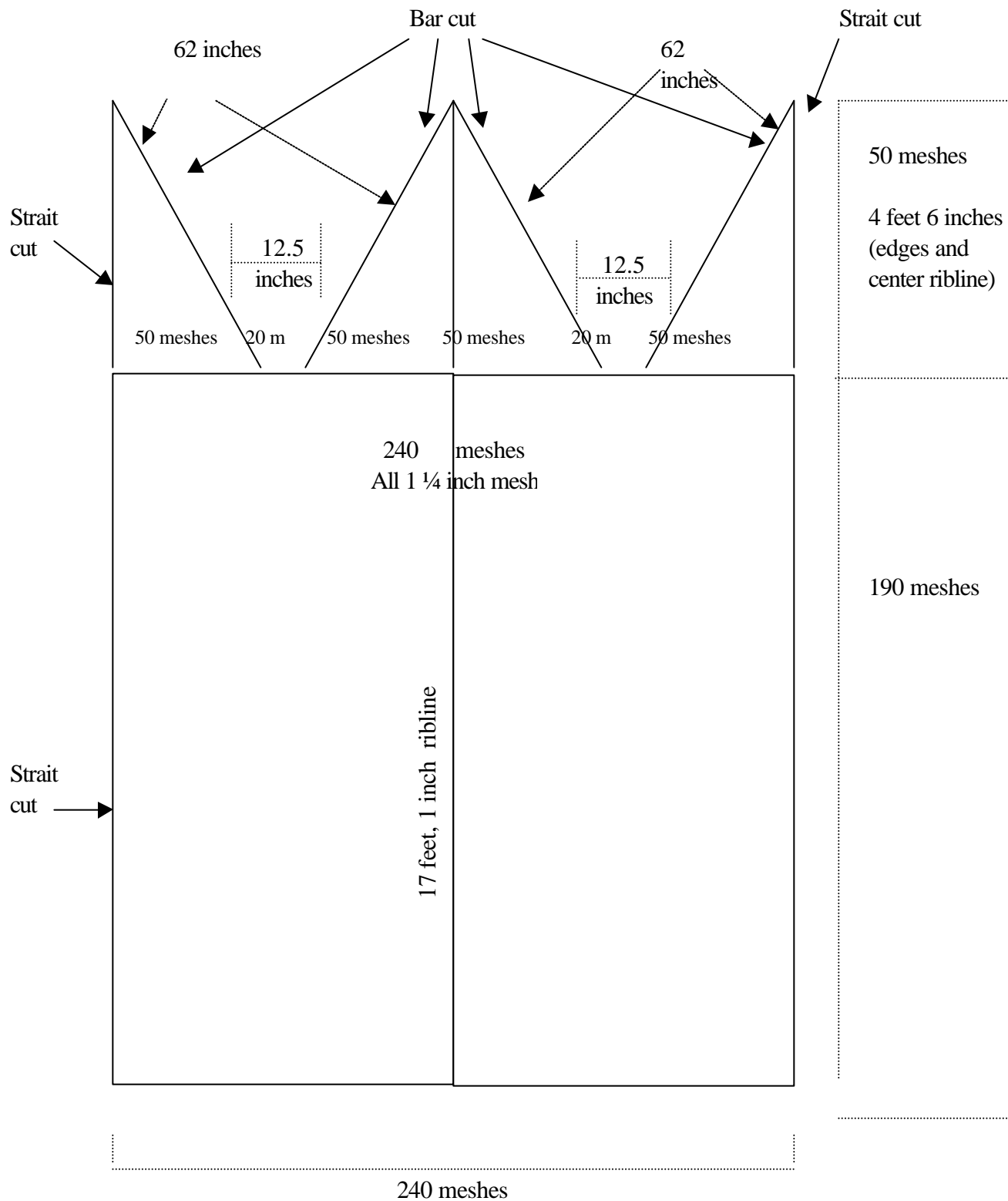
Appendix B.1. Rigging for the 61 foot ADF&G/NMFS small-mesh research trawl.

Appendix 10
RIGGING AND NET
SPECIFICATIONS

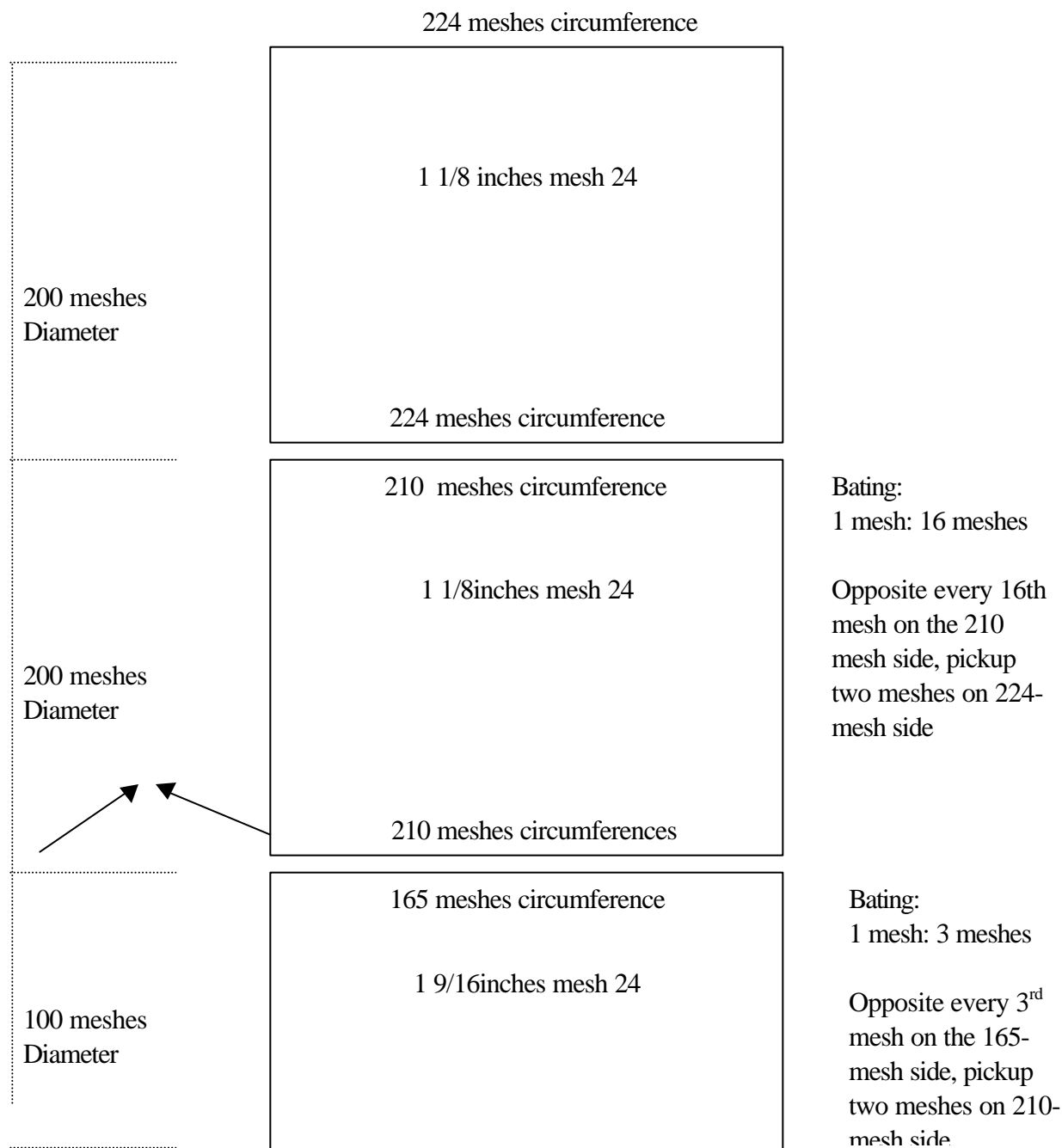
Appendix B.2. General net schematic of the 61 foot ADF&G/NMFS small-mesh research trawl.



Appendix B.3. Diagram of wing tips and side panel of ADF&G/ NMFS small-mesh research trawl.



Appendix B.4. Diagram of the intermediate and codend of an ADF&G/ NMFS small-mesh research trawl.



The riblines in the center side panel will be continued down the intermediate and codend to just above the splitting rings. The netting is to be 'hung-in' 10% along these riblines.

Appendix C. Skipper trawl record form and shipboard instructions.

ALASKA DEPARTMENT OF FISH AND GAME
TRAWL SURVEY
SKIPPER TRAWL RECORD

Skipper's Name _____

Survey Area _____

Cruise Number	Haul Number	Region	Survey Area	Stratum	Station Number	Vessel Code	Date
							month day year
(1) Starting Position Latitude Longitude degrees / mins / decimal min. degrees / mins / decimal min.				Compass Heading (magnetic) degrees		Trawl Time Start End : : (nm)	
(2) Haul Back Position degrees / mins / decimal min. degrees / mins / decimal min.						Elapsed Bottom °C (minutes)	
Depth (fathoms) Maximum Minimum Avg.			Weather Cloud Sea Swell		Scope (fathoms) Gear Perf.		
Skipper's Comments (gear problems, snags, weather, tides, etc.):							
57. Cloud Cover		Code	58 Sea State (feet)		Code	59. Swell (feet)	
Clear	1	0 - 2	1	0 - 2	1		
1/8 obscured	2	2 - 4	2	2 - 4	2		
1/4 obscured	3	4 - 6	3	4 - 6	3		
3/8 obscured	4	6 - 8	4	6 - 8	4		
1/2 obscured	5	8 - 10	5	8 - 10	5		
5/8 obscured	6	10 - 12	6	10 - 12	6		
3/4 obscured	7	12 - 14	7	12 - 14	7		
7/8 obscured	8	14 - 16	8	14 - 16	8		
Completely overcast	9	Over 16	9	Over 16	9		
63. Gear Performance		Code	Gear Performance		Code		
Gear performance satisfactory		1	Mudded down		26		
Gear performance unsatisfactory		20	Telemetry malfunction		50		
Doors nonfunctional (crossed, collapsed)		21					
Net nonfunctional (collapsed, torn, twisted, etc.)		22					
Hung up		23					
Trawl upside down		24					

Initials: _____

-Continued-

Skipper Trawl Record Instructions

This form records each haul: area, date, position, time trawled, depth, length of tow, gear performance, and weather conditions.

<u>Column Heading</u>	<u>Columns</u>	<u>Contents</u>
Cruise Number	1-4	Sequential number by year, cruise (i.e. 991).
Haul Number	5-7	Beginning with 1, each drag is numbered sequentially through each trip regardless of gear performance.
Haul Location	8	Region(see Appendix D for codes)
	9-10	Survey area (Appendix D).
	11-12	Strata (Appendix D).
	13-16	Station Number (Consult charts).
Vessel Code	17-18	Resolution = 30.
Date	19-24	Month/day/year.
Start and Haul Back Position	28-39	Record Latitude and. Longitude in degrees, minutes and decimal minutes to the nearest hundredth (.01).
Compass heading	40-42	Heading towed.
Trawl time	43-46	Using 24 hour clock.
	7-48	Elapsed time of tow (mins.).
Haul Depth	51-56	51-53 Minimum Depth (Fathoms).
	54-56	Maximum Depth (Fathoms).
Weather	57-59	57-Cloud, 58-Sea, 59-Swell (criteria on data sheet).
Scope	60-62	In fathoms (cable deployed).
Gear Performance	63-64	For each haul use performance codes on data sheet.
		Written description should accompany problem tows.
Temperature	65-67	Recorded upon download of temp probe and entered on skipper form (use 10ths of a degree).

Appendix D. Shrimp survey region, area, and stratum codes.

A.	Region Code (8)	
	<u>Region</u>	<u>Region Code Number</u>
	Kodiak	1
	Chignik-South Peninsula	2
	Unalaska	3
B.	Survey Area code (9-10)	
	KODIAK REGION	
	<u>Survey Area</u>	<u>Area Code Number</u>
	Afognak Island	01
	Marmot Bay (middle)	02
	Marmot Inner	03
	Chiniak Bay (inshore)	04
	Ugak Bay	05
	Kiliuda Bay	07
	Twoheaded Gully	08
	Alitak Bay	09
	Uyak Bay	10
	Viekoda Bay	11
	Uganik Bay	12
	Malina Bay	13
	Kukak Bay	14
	North Shelikof	15
	Central Shelikof	16
	South Shelikof	17
	Ikolik	18
	Wide Bay	19
	Albatross Bank	20
	Sitkinak Strait	21
	Puale Bay	22
	Alitak Flats	23
	Olga Bay	24
	Shelikof Strait	25
	CHIGNIK-SOUTH PENINSULA REGION	
	Mitrofanina Island	01
	Stepovak Bay	02
	Balboa-Unga Strait	04
	West Nagai Strait	05
	Pavlof	06

-Continued-

Appendix D. (page 2 of 4)

B. Survey Area Code (9-10). (Continued)

<u>Survey Area</u>	<u>Code Number</u>
Chignik Bay	07
Sanak Island	08
Kujulik Bay	09
East Nagai Strait	10
Beaver Bay	11
Belkofski Bay	12
Cold Bay	13
Port Wrangell	14
Semidi Islands	15
Ivanof Bay	17
Dolgoi Island	18
Seal Cape	19
Kuiukta Bay	20
Morzhovoi Bay	21
Aniakchak Bay	22
Nakalilok Bay	23
Chiginagak Bay	24
Kennoys Island	25
Acheredin Point	26
Sealion Rocks	27
Mountain Point	28

C. Stratum Codes (11-12)

KODIAK

<u>Survey Area</u>	<u>Station Number/Location</u>	<u>Code Number</u>
Marmot Bay	Triplets/Whale Island	2
	Kazakof Bay	3
	Duck Bay	4
Marmot Island	Izhut Bay	1
	(Inner)	2
	(Outer)	3
Chiniak Bay	801-803	2
	805-813	3
	804-805	4
	814-817	5
Ugak Bay	112-123	2
	124-139	3
Kiliuda Bay	156-159	2
	141-155; 161-166	3
	167-187	4

-Continued-

Appendix D. (page 3 of 4)

D. Stratum Codes (11-12). (Continued)		
<u>Survey Area</u>	<u>Station Number/Location</u>	<u>Code Number</u>
Twoheaded Island	(Strata 1 + 3)	1
	201-238; 275	2
	239-252	3
Alitak Bay	All stations inside headlands	2
Uyak Bay	Soiridon	2
	Uyak proper	3
	Amook Island	4
	Zachar	5
Uganik Bay	South Arm	2
	Uganik proper	3
	Sally Island	4
	Uganik passage	5
Kukak Bay	820-827	2
	828-833	3
Wide Bay	740-746	2
	747	3
Paule Bay	All Stations	1
Olga Bay	5-13	2
	3-4; 14-20	3
	1-2	4
CHIGNIK-SOUTH PENINSULA		
Mitrofanina Island	1971-73; 1097; 1106	2
	1-5; 1995	3
	6-8; 12-14; 20-22	4
	1974-1977/ 1979-1986/ 1115-1116;	5
	1135-1135; 1155-1166	
Stepovak Bay	11, 18, 19, 26-28, 26-38, 48-51, 61-64, 71	2
	76, 89-93, 109-112	3
	72-75, 84-88, 103-108	4
	169-171, 195-197, 222-224, 243, 261	5
	259-260, 277-278, 291-292	6
	123-129, 143-149, 163-168, 189-194,	7
	217-221, 238-242, 257-258, 275-276	
Balboa-Unga Strait	130-132, 150-153, 172-175, 198-201	1
Pavlof Bay	All Stations	1

-Continued-

Appendix D. (page 4 of 4)

D. Stratum Codes (11-12). (Continued)		
<u>Survey Area</u>	<u>Station Number/Location</u>	<u>Code Number</u>
Chignik Bay	Chignik Bay proper	2
	Castle Bay	3
Kujulik Bay	Inside Reef	2
	Outside reef	3
Beaver Bay	All Stations	1
Ivanof Bay	1996; 9-10; 16-17	2
	1997-1999; 35	3
	45-47; 58-60	4
	8, 15, 23-25, 32-34	5
	42-44, 55-57, 68-70, 80-83	6
Kuiukta Bay	All Stations	1
Morzhovoi Bay	3000-3022	2
	3023-3026; 3032-3034;	
	3030-3042; 3045-3047	3
Aniakchak Bay	All Stations	1
Nakalilok Bay	All Stations	1
Chiginagak Bay	All Stations	1
Kennoys Island	All Stations	1
Acheredin Point	All Stations	1
Sealion Rocks	All Stations	1
Mountain Point	All Stations	1
D. Vessel Code (17-18)		
<u>VESSELS</u>	<u>Vessel Code Number</u>	
R/V RESOLUTION	30	
F/V DAWN	32	
M/V SMOLT	18	
R/V PANDALUS	40	
F/V ROYAL BARON	45	
R/V ALASKA	50	
F/V WESTERN DAWN	55	
F/V DOMINION	60	
F/V BUCK-N-ANN	65	
F/V LAURA	70	

Appendix E.1. Square mileage table, Kodiak District.

<u>Survey Area</u>	<u>Strata Code</u>	<u>Square Mileage</u>
KODIAK		
Marmot Bay	2	30.96
	3	1.48
	4	10.75
Marmot Island	2	8.40
	3	15.30
Chiniak Bay	2	3.05
	3	5.98
	4	2.05
	5	4.03
Ugak Bay	2	12.04
	3	15.81
Kiliuda Bay	2	3.99
	3	21.25
	4	22.01
Twoheaded Island	2	38.28
	3	13.47
Alitak Bay	2	45.27
Uyak Bay	2	7.02
	3	16.95
	4	1.95
	5	0.82
Uganik Bay	2	0.68
	3	12.62
	4	1.52
	5	5.67
Kukak Bay	2	6.42
	3	6.19
Wide Bay	2	7.33
	3	.92
Puale Bay	1	9.40
Alitak Flats	3	78.30
Olga Bay	2	10.62
	3	6.85
	4	1.57

Appendix E.2. Square mileage table, Chignik and South Peninsula District.

CHIGNIK-SOUTH PENINSULA		
<u>Survey Area</u>	<u>Strata Code</u>	<u>Square Mileage</u>
Mitrofanina Island	2	17.50
	3	24.60
	4	35.20
	5	78.00
Stepovak Bay	2	72.00
	3	32.00
	4	60.00
	5	44.00
	6	24.00
		160.00
Balboa-Unga Strait	1	53.20
Pavlof Bay	1	88.40
Chignik Bay	2	33.70
	3	10.50
Kujulik	2	4.30
	3	18.50
Beaver Bay	1	24.00
Belkofski Bay	1	11.50
Ivanof Bay	2	20.13
	3	17.30
	4	24.75
	5	28.02
	6	52.00
Kuiukta Bay	1	15.90
Morzhovoi Bay	2	85.20
	3	52.00
Aniakchak Bay	1	10.64
Nakalilok Bay	1	5.63
Chiginagak Bay	1	4.74
Kennoys Island	1	52.00
Acheradin Point	1	24.00
Sealion Rocks	1	32.00
Mountain Point	1	1.00

Appendix E.3. Square mileage table for irregular survey stations, Kodiak District.

Survey Area	Station Number	Square Miles	Survey Area	Station Number	Square Miles
Outer Marmot	1	1.74	Middle Marmot	99	4.06
Outer Marmot	15	3.73	Middle Marmot	100	3.11
Outer Marmot	21	3.04	Middle Marmot	110	5.04
Outer Marmot	22	3.20	Ugak	112	1.37
Outer Marmot	23	4.16	Ugak	113	1.18
Outer Marmot	24	3.17	Ugak	114	0.93
Outer Marmot	25	1.55	Ugak	115	1.02
Outer Marmot	29	2.93	Ugak	116	1.19
Outer Marmot	30	3.75	Ugak	117	0.73
Outer Marmot	31	3.55	Ugak	118	0.97
Outer Marmot	34	4.68	Ugak	119	0.94
Outer Marmot	35	1.65	Ugak	120	0.91
Outer Marmot	39	5.51	Ugak	121	0.84
Outer Marmot	40	3.58	Ugak	122	0.86
Outer Marmot	44	6.48	Ugak	123	1.10
Outer Marmot	45	2.17	Ugak	125	0.91
Outer Marmot	50	4.39	Ugak	128	0.92
Outer Marmot	51	2.68	Ugak	131	0.96
Outer Marmot	57	3.33	Ugak	134	0.99
Outer Marmot	58	2.73	Ugak	137	1.03
Outer Marmot	59	4.12	Kiliuda	141	0.52
Outer Marmot	65	5.59	Kiliuda	142	1.07
Outer Marmot	74	3.68	Kiliuda	143	0.99
Outer Marmot	75	1.85	Kiliuda	144	1.17
Outer Marmot	82	5.53	Kiliuda	145	0.98
Outer Marmot	83	2.69	Kiliuda	146	1.00
Outer Marmot	90	4.12	Kiliuda	147	0.98
Outer Marmot	98	3.43	Kiliuda	148	1.09
Kiliuda	149	1.14	Twoheaded	207	1.00
Kiliuda	150	0.94	Twoheaded	208	0.86
Kiliuda	151	1.05	Twoheaded	209	0.89
Kiliuda	152	0.93	Twoheaded	210	1.00
Kiliuda	153	0.86	Twoheaded	211	1.01
Kiliuda	154	1.11	Twoheaded	212	1.00
Kiliuda	155	0.98	Twoheaded	213	1.00
Kiliuda	156	0.77	Twoheaded	214	1.01
Kiliuda	157	1.17	Twoheaded	215	0.87
Kiliuda	158	1.05	Twoheaded	217	1.04
Kiliuda	161	1.12	Twoheaded	218	0.95
Kiliuda	162	0.98	Twoheaded	220	1.04
Kiliuda	163	1.34	Twoheaded	221	1.33
Kiliuda	164	0.92	Twoheaded	222	1.13
Kiliuda	166	1.08	Twoheaded	223	1.15
Kiliuda	167	0.99	Twoheaded	225	1.23
Kiliuda	170	1.02	Twoheaded	226	0.66
Kiliuda	171	1.00	Twoheaded	229	1.04
Kiliuda	174	1.40	Twoheaded	230	0.99
Kiliuda	178	1.12	Twoheaded	233	0.65
Kiliuda	183	1.15	Twoheaded	234	0.59
Kiliuda	187	1.33	Twoheaded	238	1.11
Twoheaded	201	0.80	Twoheaded	239	1.14

-Continued-

Appendix E.3. (page 2 of 3)

Twoheaded	202	0.87	Twoheaded	243	0.86
Twoheaded	203	1.04	Twoheaded	244	0.72
Twoheaded	204	0.90	Twoheaded	245	1.19
Twoheaded	205	1.03	Twoheaded	246	0.56
Twoheaded	206	1.04	Twoheaded	253	1.01
Twoheaded	260	0.74	Alitak	328	0.61
Twoheaded	261	0.72	Alitak	329	
Twoheaded	267	1.08	Alitak	331	1.08
Twoheaded	274	0.93	Alitak	332	1.07
Twoheaded	275	1.05	Alitak	333	1.02
Alitak	281	1.31	Alitak	334	0.93
Alitak	282	1.13	Alitak	335	1.06
Alitak	283	1.14	Alitak	336	1.19
Alitak	284	1.13	Alitak	337	1.23
Alitak	285	0.94	Alitak	351	1.09
Alitak	286	1.05	Alitak	339	
Alitak	287	0.97	Alitak	350	
Alitak	288	1.11	Alitak	351	0.51
Alitak	289	0.84	Alitak	352	1.09
Alitak	290	1.00	Alitak	363	
Alitak	291	1.68	Alitak	374	1.01
Alitak	292	1.21	Alitak	375	0.94
Alitak	293	1.30	Alitak	385	
Alitak	294	0.88	Alitak	386	1.06
Alitak	295	0.87	Alitak	395	1.06
Alitak	296	1.04	Alitak	396	0.70
Alitak	297	1.03	Alitak	398	
Alitak	298	1.46	Alitak	404	
Alitak	299	0.93	Alitak	407	
Alitak	300	1.05	Alitak	408	
Alitak	302	0.98	Alitak	410	0.66
Alitak	313	1.13	Alitak	411	
Alitak	321	0.82	Inner Marmot	401	
Inner Marmot	402	1.68	Inner Marmot	477	0.55
Inner Marmot	403	0.97	Inner Marmot	479	0.78
Inner Marmot	404	1.24	Inner Marmot	481	0.83
Inner Marmot	405	0.46	Inner Marmot	489	
Inner Marmot	406	0.68	Inner Marmot	490	
Inner Marmot	408	0.95	Inner Marmot	491	
Inner Marmot	409	0.92	Inner Marmot	492	
Inner Marmot	410	1.59	Inner Marmot	493	
Inner Marmot	412	1.67	Inner Marmot	494	
Inner Marmot	413	1.04	Inner Marmot	495	
Inner Marmot	416	0.88	Inner Marmot	496	
Inner Marmot	417	0.99	Inner Marmot	497	
Inner Marmot	421	0.87	Inner Marmot	498	
Inner Marmot	422	1.19	Inner Marmot	500	
Inner Marmot	427	0.6	Inner Marmot	501	
Inner Marmot	428	0.82	Inner Marmot	510	
Inner Marmot	429	0.66	Inner Marmot	512	
Inner Marmot	434	1.57	Inner Marmot	533	
Inner Marmot	435	0.69	Kalsin/Chiniak	801	0.90
Inner Marmot	436	0.77	Kalsin/Chiniak	802	3.60
Inner Marmot	441	1.11	Kalsin/Chiniak	803	4.50

-Continued-

Appendix E.3. (page 3 of 3)

Inner Marmot	442	1.49	Kalsin/Chiniak	804	3.10
Inner Marmot	446	1.40	Kalsin/Chiniak	805	2.60
Inner Marmot	451	0.92	Kalsin/Chiniak	806	2.10
Inner Marmot	456	0.80	Kalsin/Chiniak	807	3.00
Inner Marmot	462	1.37	Middle Marmot	99	3.60
Inner Marmot	467	0.92	Middle Marmot	100	2.57
Inner Marmot	470	1.36	Middle Marmot	110	2.67
Uyak	601	1.04	Uganik	655	1.60
Uyak	602	1.14	Uganik	656	1.42
Uyak	603	1.30	Uganik	657	1.22
Uyak	604	2.05	Uganik	658	1.62
Uyak	605	1.30	Uganik	659	1.20
Uyak	606	1.48	Uganik	660	0.68
Uyak	607	1.27	Uganik	661	0.70
Uyak	608	1.34	Uganik	662	0.83
Uyak	609	1.15	Uganik	663	1.67
Uyak	610	1.34	Viekoda	681	1.45
Uyak	611	2.03	Viekoda	682	1.34
Uyak	612	1.60	Viekoda	683	0.85
Uyak	627	1.76	Viekoda	684	1.03
Uyak	628	1.44	Viekoda	685	1.31
Uyak	629	1.40	Viekoda	686	0.85
Uyak	630	1.11			
Uyak	631	1.32			
Uyak	632	1.95			
Uyak	633	1.95			
Uyak	634	0.82			
Uganik	649	0.92			
Uganik	650	1.62			
Uganik	651	1.48			
Uganik	652	1.63			
Uganik	652.5	0.64			
Ugaink	653	1.59			
Ugaink	654	1.87			

[illegible]

Check here after data has been entered:



Header Information:

Date	Date (mm/dd/yy) of sample haul
Cruise	Enter prearranged cruise number (e.g. 0302, where 03 signifies the year and 02 the particular survey.
Vessel	Vessel name conducting the survey.
Location	Common name for bay or locality.
Haul No.	List sequential haul number. Must match the haul number recorded on the skipper trawl record.
Total Wt.	Enter weight recorded from the crane scale.
Tare Wt.	Enter weight from the empty net codend.
Catch Wt.	Weight of the sample catch (Total wt. minus the tare wt.).

Data Fields:

Species name	List specie name, either common or scientific, for each species found in the haul. Shrimp may be combined here, if there are too many to reasonably sort in the available time.
c. o.	Count overs. Enumerate fish that have been counted overboard as part of a whole haul measurement.
Whole haul weights or lengths	List weights or lengths for species where 100% of the catch is sampled.
Non-measured subsample weights	List weights from species that are part of the subsample but not measured for length.
Measured subsample wt.	List weights that are part of the subsample and measured for length.
Count	No. of animals from either whole weights or subsample wt.
100%	Check this column if species is "whole hauled".

Shrimp Composition:

Specie name	List shrimp species in composition sample.
Comp. Wt.	List weight from each specie.
%comp.	Determine % of each specie in composition sample.
Subsample weight	Determine subsample weight for each shrimp specie (% comp. X total shrimp subsample weight from above).
Comp. Count	Number of individuals in the composition sample.
Subsample No.	Number of shrimp estimated in subsample weight. For shrimp species with large numbers in the composition sample (ie. pinks) it is easier to derive the subsample number using the average weight calculated on the length frequency form.

Appendix G. Shrimp length frequency form and shipboard instructions.

ADF&G Shrimp Length Frequency Form

Sample type 3

Haul Number _____ Cruise No. _____ Date _____

0.5 mm	Total	Tally	Shrimp species name or code _____		
8.0			Total weight (grams) _____ Total no. of shrimp _____ Average weight _____		
8.5					
9.0					
9.5					
10.0					
10.5					
11.0					
11.5					
12.0					
12.5					
13.0					
13.5					
14.0					
14.5					
15.0					
15.5					
16.0					
16.5					
17.0					
17.5					
18.0					
18.5					
19.0					
19.5					
20.0			0.5 mm	Total	Tally
20.5			28.0		
21.0			28.5		
21.5			29.0		
22.0			29.5		
22.5			30.0		
23.0			30.5		
23.5			31.0		
24.0			31.5		
24.5			32.0		
25.0			32.5		
25.5			Write in additional lengths below as needed		
26.0					
26.5					
27.0					
27.5					

Fill in header information as needed: Haul number, Cruise number, Date of haul

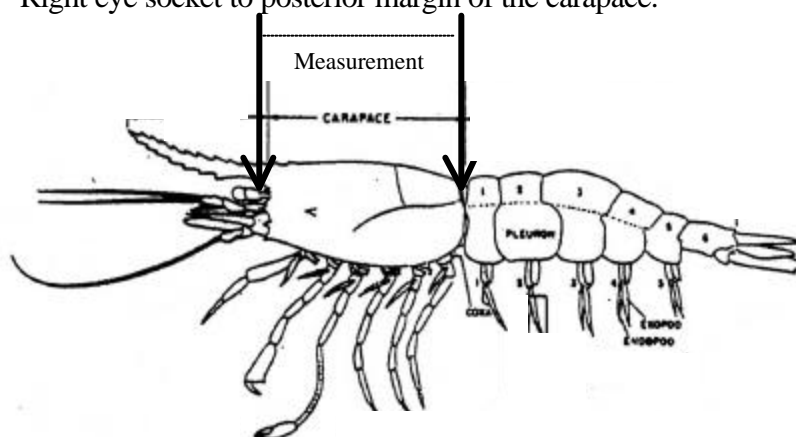
Record code of species being sampled in blank provided:

Northern pink shrimp	=	1
Sidestriped shrimp	=	2
Humpy shrimp	=	3
Other	=	write out name on form

Record total weight of sample in grams in space provided

Record lengths as tally mark in spaces provided. Total each line and record number in “total” column.

Right eye socket to posterior margin of the carapace.



- Measure to the nearest half-millimeter.

Measurement examples:

- ♦ If the number on the caliper were to read 25.0 to 25.25, the measurement would be 25.0 mm
- ♦ If the number on the caliper were to read 25.26 to 25.75, the measurement would be 25.5 mm
- ♦ If the number on the caliper were to read 25.76 to 25.99, the measurement would be 26.0 mm

Appendix I. Methodology for sexing pandalid shrimp.

Note: Reprinted with permission from 'Standard operating procedure for sexing pandalid shrimp in the Prince William Sound. By Charlie Trowbridge and Dan Coyer, November 1989.'

Introduction

Pandalid shrimp in Alaska are typically protandric hermaphrodites, therefore, three sexual phases can be identified: male, transitional, and female. Determining the sex of pandalid shrimp by examining sex organs is difficult and time consuming, but using the secondary sexual characteristic of endopod development, which closely tracks gonad development, allow sex to be determined easily and accurately. This method is the preferred procedure and is performed according to Butler's description in Shrimps of the Pacific Coast of Canada (1980).

Equipment:

- ♦ Two needle probes
- ♦ Forceps
- ♦ Bright source of lighting
- ♦ Dark background to visualize structures against
- ♦ 3X source of magnification
- ♦ Surgical gloves may be desirable as the shrimp are typically preserved in an ethyl alcohol/sea water solution

Methodology

Using the needle probe, isolate and examine the first and second endopods.

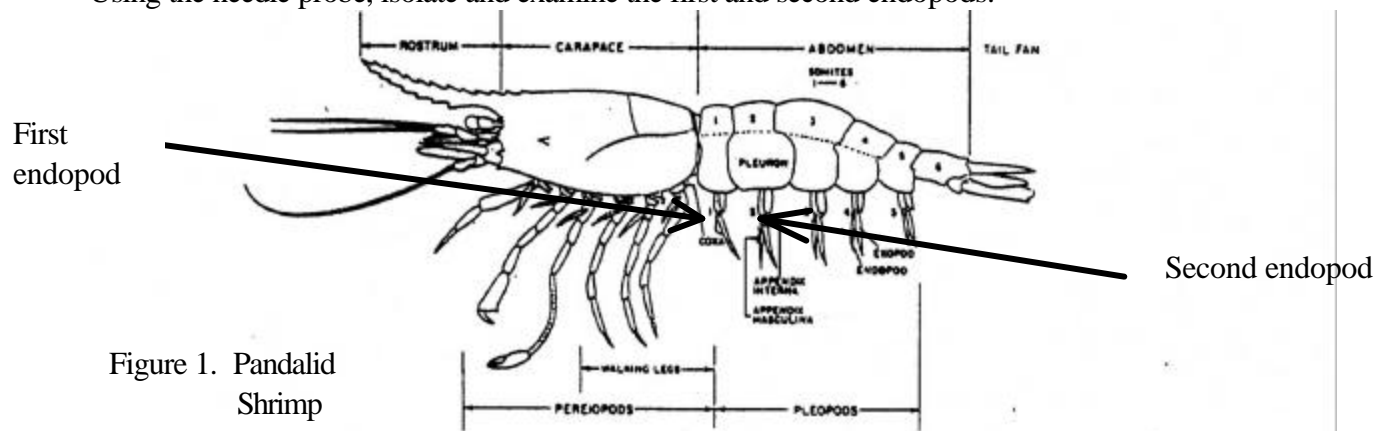


Figure 1. Pandalid Shrimp

You may need to completely remove the exopods with forceps to examine them against a dark background.

-Continued-

Methodology for sexing pandalid shrimp.

Use of the second pleopod is very useful in determining the transitional phase of specimens.

- ♦ A male is identified as having two small processes nearly the same length branching from the basal inner margin of the endopod. The medial process, the appendix masculina, is distally spined. The lateral process is the appendix interna and is tipped with hook-like setae.
- ♦ A transitional phase is identified as having both processes with the appendix masculina clearly atrophied to approximately one-half (or less) the length of the appendix interna.
- ♦ A female is identified as having only the appendix interna, typically devoid of spines or setae. Ovigerous females are apparent by the presence of eggs.

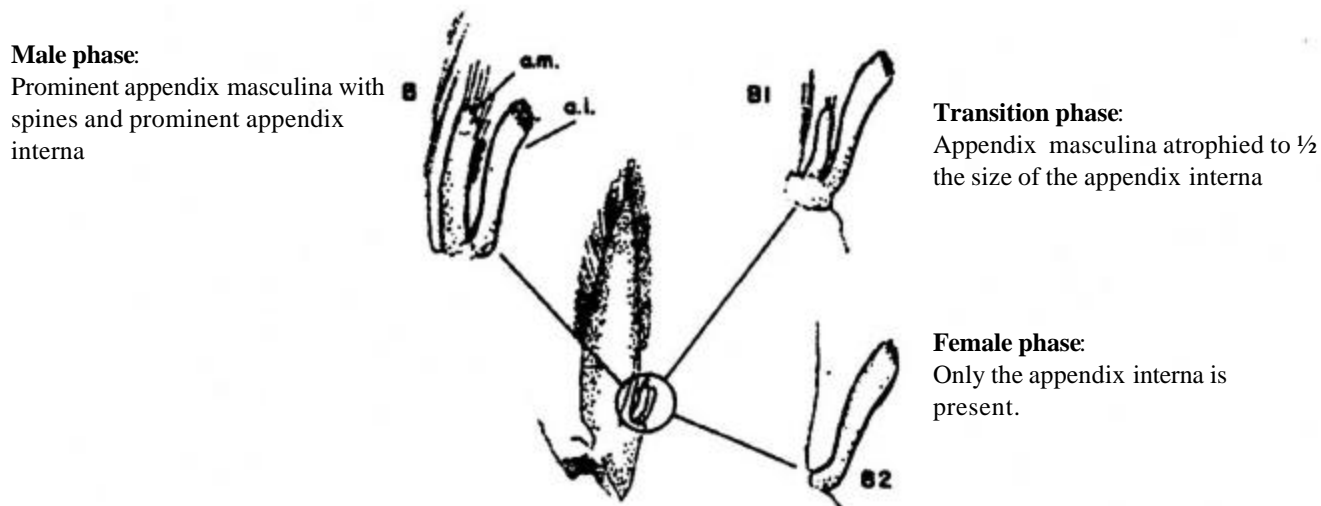


Figure 2. Endopod of second pleopod.

The other method used to determine sex is to use the distal margin of the first endopod . The characteristics for so doing are listed in the following page.

-Continued-

Methodology for sexing pandalid shrimp.

First endpod distal lobe characteristics:

- ♦ Males- bifid, equally lobed with a median cleft
- ♦ Transitional- on the medial edge near the tip, there will be a small rigid protuberance
- ♦ Female- the tip is flame shaped like the end of a quill and sharply pointed

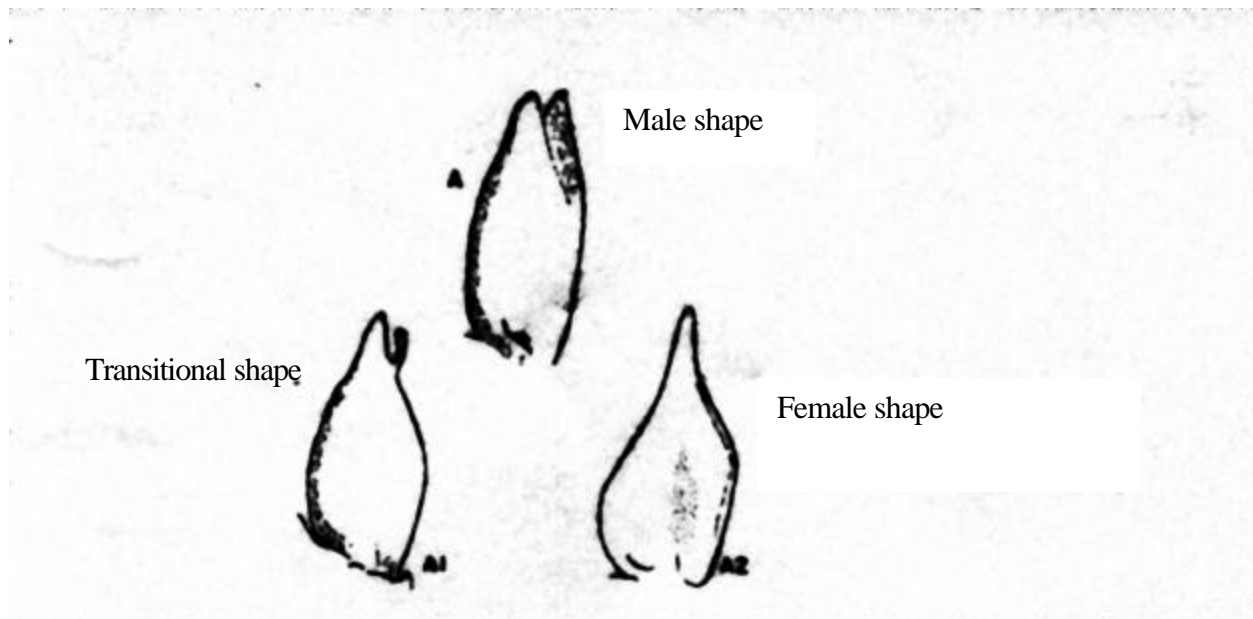


Figure 3. Endopod of the first pleopod.

-Continued-

Methodology for sexing pandalid shrimp.

Finally, both the first and second endpod may need to be used to positively determine sex.

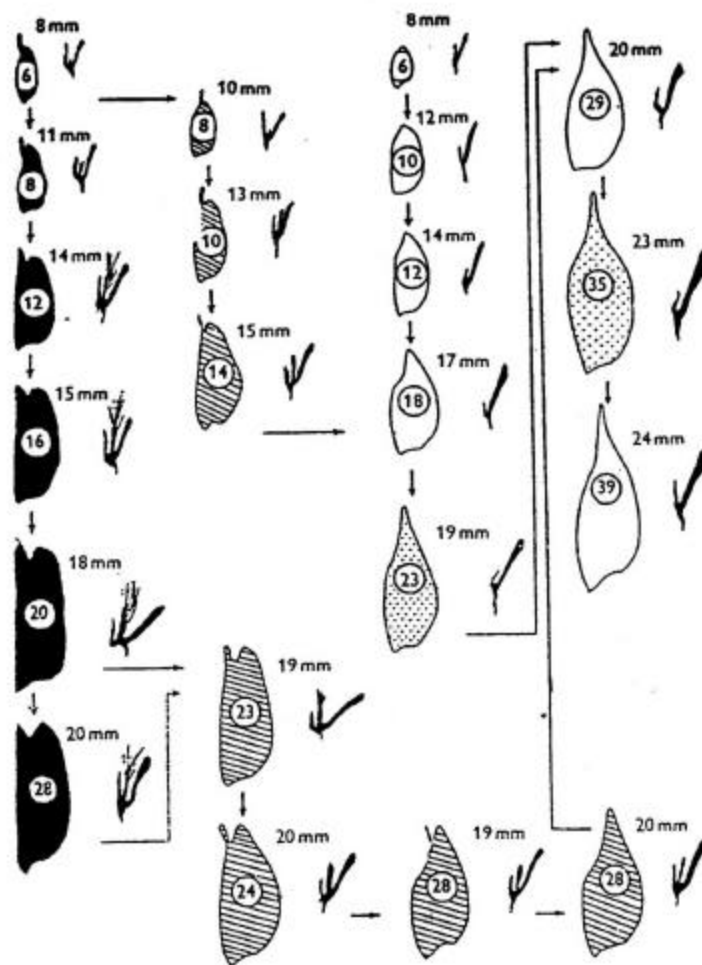


Figure 4. First endopod development with second endopod appendix interna and appendix masculina development shown beside. Approximate age in month shown in the circle and approximate carapace width listed above

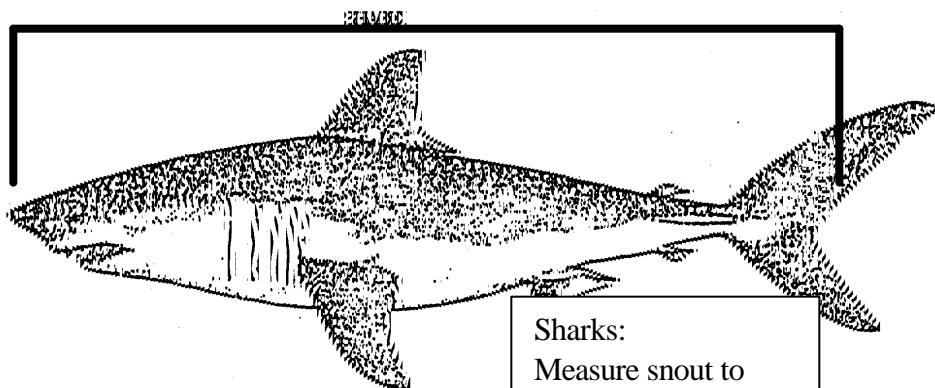
Male

Transition

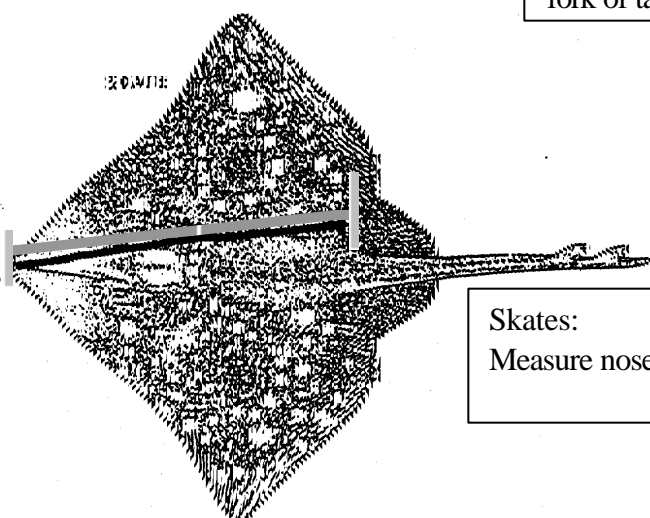
Female

It is very rare that between the two endopods that definitive sex cannot be ascertained. Sometimes endopods will be missing and may reduce the number of endopods available for sexing. If unable to determine sex, simply choose a new animal as the target will be 300 per strata jar. There should be sufficient numbers in each sample to ensure that 300 can be measured and sexed.

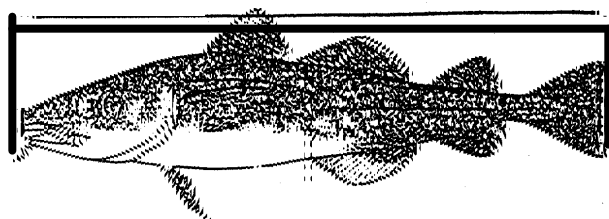
Appendix J. Shark, skate, roundfish, and flatfish length frequency measurement.



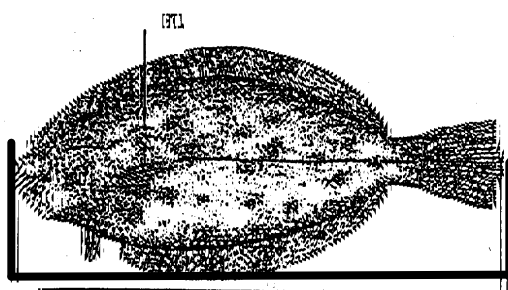
Sharks:
Measure snout to
fork of tail



Skates:
Measure nose to notch of wing



Roundfish:
Measure nose to fork area of tail



Flatfish:
Measure nose to tip of tail

For all fish:

- ♦ Make sure and measure straight line distance.

Data Entry Program and Polycorder

INSTRUCTION MANUAL

Revised
1998

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TABLE OF CONTENTS

GENERAL DATA ENTRY INSTRUCTIONS.....	3
AT THE BEGINNING OF THE SURVEY.....	3
AT THE BEGINNING OF EACH LEG	3
DOWNLOADING POLYCORDER / ENTERING DATA	4
AT THE END OF EACH LEG.....	8
ANALYSIS DATABASE.....	9
DATA CHECKING	10
TROUBLESHOOTING PROBLEMS	11
POLYCORDER PROBLEMS.....	11
TIPS FOR CATCH ENTRY.....	15
REBUILDING A DAMAGED DATABASE.....	18
INCORRECT SPECIES LISTS.....	18
(RE)INSTALLING DATA ENTRY PROGRAM.....	19
POLYCORDER MANUAL	21
MAJOR DOS AND DON'TS FOR THE POLYCORDER.....	22
EDITING DATA IN THE POLYCORDER.....	25
DOWNLOADING DATA FROM THE POLYCORDER	25
MAINTAINING THE POLYCORDER	27
SOLVING TECHNICAL PROBLEMS FOR THE POLYCORDER.....	29

GENERAL DATA ENTRY INSTRUCTIONS

AT THE BEGINNING OF THE SURVEY

IMPORTANT!

The programs and database should be set up prior to the survey, but the Vessel / Cruise may not be known, so it is essential that the field party chief check the Vessel Cruise number in the database before starting the first leg. This is a simple process.

On the **MASTER** form, click on **EDIT** and then **UPDATE VESSEL / CRUISE**. This will bring up a form which will display the current settings. If they are OK, just click **DONE**, else make corrections and click **DONE**.

These values reside in the **VESSEL_CRUISE** table in the database, and in the **VES_CRU.BAK** file; they are used to make your printouts. This table and file are the only way the data can be identified to vessel and cruise, which are *not* fields in any of the tables, although Vessel and Cruise are now exported to all backup files (.BAK files).

DO NOT change vessel / cruise during a cruise; if you need a different vessel / cruise for a special experiment, start a new database.

AT THE BEGINNING OF EACH LEG

The file **DATA_ENT.MDB** contains all the code and tables necessary for the **Data Entry** program, as well as all the data collected in the database. At the beginning of each leg, check to see if the previous FPC has backed up this file into the **C:/DATA/LEGx** (x = leg number) subdirectory and back it up if necessary, since you will be deleting data from it.

From the Main Menu in the **Data Entry** Program, press **EDIT** and then in the Edit Menu, click on **Delete Data**. Click on the **Press for New Leg** button in the Delete Data Menu. You will be warned about deleting data, but this is the right time to do it (you did back the original up to the **LEGx** subdirectory, right?), so click on **OK**. You are now ready to enter data for your new leg.

Note that deleting the data doesn't reduce the size of the database file, which should be compacted. If you don't feel comfortable with the following instructions, they can be skipped, but you will get better performance if you follow them. Open **ACCESS** (not **Data Entry**) and do not choose a database. From the main tool bar at the top of the screen, press the **Tools** menu and then select **Database Utilities**. From this menu, select and click **Compress Database**. At this time, you select **C:/DATA/DATA_ENT.MDB** from the browser selection. **ACCESS** will suggest a compressed database name, usually **DB1.MDB**. Just use this default, and click **OK**. After compression, get out of **ACCESS** and get into the **C:/DATA** subdirectory. Delete the old **DATA_ENT.MDB** file (it should have been

Appendix K. (page 4 of 22)

backed up under one of the LEGx subdirectory by now), and RENAME the DB1.MDB file to DATA_ENT.MDB. You will see that the database is megabytes smaller.

NOTE: All legs will be working in the C:/DATA directory; the LEGX subdirectories are only for storing old data.

DOWNLOADING POLYCORDER / ENTERING DATA

STARTING OUT

The new **Data Entry** program is a Windows 95 based program implemented in the ACCESS 97 database system, also a Windows 95 program. Once in Windows, check to see if the **Data Entry** icon is visible; if not, click the Data Entry group to expose the icon. If there is no icon, see the section **CREATE ICON FOR DATA ENTRY** on page 20.

To enter data, click the **Data Entry** icon. You will see ACCESS load and open the database. You are ready for all data related tasks when you see the **MASTER** menu of buttons open. Simply press the button for the service you want to use. Most of the time operations will operate from left to right: DOWNLOAD POLYCORDER then ENTER CATCH and later ENTER SPECIMEN. You can review previously entered data, edit and backup data, and analyze the database for errors and from the lower part of the menu. A manual LENGTH ENTRY form is available, but you are encouraged to use the polycorders whenever possible, and strongly discouraged from use of manual length entry for any important species, since the strength of the built-in data checking is heavily dependant on polycorder data.

Most functions related to editing data are available by clicking the **EDIT** button, which opens a new menu with buttons for editing catch, length and specimen data. You can also add species to the polycorder and species lists from this menu or from within the **CATCH ENTRY** form.

Virtually all of your data entry and editing will occur in ACCESS. Catch data will be printed out using an ACCESS report generator.

SEQUENCE OF EVENTS

1. DOWNLOAD POLYCORDER

If there is any question of whether the polycorders are from the correct haul or not, check the haul number prior to downloading them.

Connect the RS-232 cable to the first polycorder and prepare all polycorders for transfer. You can wait at the "TRANSFER DATA" menu item or enter that mode and wait at the "TRANSMIT TYPE?" prompt. Transmit type is 0. See page 25 for complete polycorder download instructions.

1. DOWNLOAD THE POLYCORDER

Download all polycorders from your haul. A printout will be automatically generated after you accept the data in the summary form. You should always download all polycorders for one haul together in one download session. See the section "Forgot a polycorder" in the Problems and Solutions section, page 13, for instructions if you can't do this.

*******ALWAYS START THE COMPUTER TRANSFER FIRST!*******

Do not start the polycorder transfer until you see only the yellow colored "DOWNLOADING POLYCORDER" form, with no pop-up forms (click on **OK** to get the computer ready). If you have more than one polycorder to download, it is a good idea not to answer the "Download another polycorder?" prompt until you have prepared the second polycorder for data transfer. If you answer "Y", it is possible to be timed out by the download program while you are setting up the second polycorder. On the other hand, the program will wait indefinitely for your response to the "Download another polycorder?" prompt.

2. CHECK CATCH SUMMARY AGAINST CATCH FORM

It is much easier to correct polycorder errors at this point, before you start entering the catch data.

Scan the summary for abnormal lengths (a flag in the final column), check that both sexes are present for each species (in some cases a single sex may be correct, but it should be checked), and most importantly, check the estimated weights against the measured weights on the deck catch form. Small differences are normal and can be ignored. Values that differ substantially between the ACCESS form and the deck form should be investigated thoroughly. See the Troubleshooting Problems section, page 11, for suggestions.

If you find problems with the polycorder data, simply hit the **EDIT** button. When you exit EDIT, it will return you to the **Length Summary** form, where you can double check that your corrections have taken care of the problems. You should continue the **EDIT / Length Summary** sequence until all problems are resolved. When you are satisfied with the data, hit the **QUIT** button to exit. You will be given the choice to save (with automatic printing of the length frequency data), or abandon without saving, which will delete all your length data for this haul. If you choose this option, you will have to transfer all polycorder data again. Since Polycorder data is unrecoverable after they have been reset, the program is designed to not allow you to exit without printing your data.

3. ENTER CATCH

After you press the **ENTER CATCH** button and give it a Haul number, ACCESS calculates estimated weights for that haul from the length data and then opens the Catch Entry Form for data entry. Be sure to fill in the header section (**SUBSAMPLE TYPE**) before entering biological data. **If you need to edit the header after you have started entering biological data, click on the SUBSAMPLE CODE box, and you will be asked if you want to edit the header. Click OK and the EDIT HEADER form will open. As soon as you have entered your new data, the form will close and return you to your current CATCH form.**

After you have filled in the header, open the species list by clicking on the “down arrow” on the species list combo box, if it does not open on its own. All species recorded during this survey in previous years are in this list. To enter multiple basket weights for a species, click the **Multiple Baskets** button. In this mode, a window pops up and a series of basket weights can be entered and is summed automatically. Hit <Enter> on a blank line to close the basket form, and the data is automatically entered into the appropriate Weight field. This is slow for entering most data where there is a subsample weight only, so a "Single basket" mode is also available, which enters data directly into the cell. Most people find it easiest to enter all the data containing multiple basket weights first and then switch to "Single basket" mode for the rest of the data. The button is a toggle however, so you can switch back and forth whenever you want. If you need to enter data into the **NON-SUB** column, you need to either click the button above this column, or hit the <F12> key

The Catch Entry Form contains several data checking features:

- You must select a species from the built in list.

- (Although new species can be easily added to this list.)

- You cannot enter the same species twice.

- The number of lengthed fish is filled in automatically for species downloaded from the polycorder.

- The weights of measured fish are automatically checked against the estimated weights from the polycorder

- The estimated weight or number is visible at the bottom of the screen as long as you are in a cell.

- The estimated average weight is displayed at the far right hand side.

When you are done entering data, click the **QUIT** button to exit the entry form. You will be prompted as to whether you want to quit and save, quit and not save, or cancel (return to the form).

Appendix K. (page 6 of 22)

You must erase the data in the polycorder to prepare it for the next haul. It is best to wait until after you have entered the data to erase the data, but if you don't have time to enter the catch, examine the Length printout carefully against the Catch form and if everything seems satisfactory, you can erase the data in the polycorder. As long as the data is successfully saved from **Length Summary**, you no longer need the polycorder data, although some problems, like forgetting to download one polycorder are much easier to correct if all the polycorders still contain data.

To erase polycorder data, scroll down the polycorder main menu to "Erase Data" and press <ENTER>, respond to the prompt "ERASE ALL DATA?" by pressing <SHF> then <3>, which corresponds to "y". All data on the polycorder will be erased.

Hit <ESC>, <0> (that's a zero), <ENTER> to get into the Haul header. Set the number for the next haul to prepare the polycorder for its next use.

5. ENTER SPECIMEN

The Specimen Form is set up a little differently from the catch form. The Specimen Form is set as "Sorted baskets" as default, assuming that the data entered will be a series of one sex of fish followed by a series of another sex. In this mode, the **Sex** field is filled in at the beginning and then automatically fills in the same sex for each subsequent record. You must press the button at the top of the Sex column to change to a new sex, or press <F6>. If your data has mixed sexes, simply press the "Sorted baskets" mode and the cursor will stop in the **Sex** field for each record ("Unsorted baskets" mode). Most other columns in the form work in a similar way; **if the button at the top is grey, the cursor will not stop in that column, but it will stop in any column with a blue button at the top.** These are all toggle buttons and can be turned on and off whenever required during data entry.

When the first record is entered, you will be prompted with the next consecutive specimen number for that species (or 1, if it is not yet in the database). If you enter your data sheets in the correct order, this can act as an early warning system if there is a problem with the Specimen Number sequence. The specimen number is automatically updated from record to record. **Note that the updating is canceled if you leave the new record line and edit an earlier line!** If you edit a previous line, you will need to enter the specimen number one or two times to "prime the pump" for the automatic incrementing to work. The reason for this is that the program is set up to accept blank specimen numbers. This is convenient in cases where weight-length data is collected concurrently and interspersed with otolith data.

The form is also set up as default to automatically fill in the trailing zero on length data, so you only need to enter "24" to get "240" in the length column. If you do not want this feature, simply click the **cm** button to return to **mm** entry. This is a toggle and can be repeatedly changed as convenient. This feature is also turned off if you leave the current line and edit earlier data, so you **must** enter "240" **when editing** to see "240" in the box. This is a little awkward, but better than a zero being added each time you scroll through the data! The automatic feature is re-initiated when you start entering new data again.

When you are done entering data, click the **QUIT** button to exit the **Specimen Entry** form. You will be prompted as to whether you want to quit and save, quit and not save, or cancel (return to the form).

6. EDIT DATA (if necessary).

The editing forms look very similar to the entry forms, but are maximized for moving around in the form rather than checking the data or quickly adding new lines. If you are half-way through a form, and realize that you need to edit the length data before you continue, it is probably easiest to abandon the form (Quit, do not save OR Abandon form), rather than entering a lot of new data in the **Edit** forms. If you have almost all the data entered, then you may want to save and edit later.

Edit Catch does not automatically warn you about differences between estimated and observed weights, but it does show the estimated value for the current cell in a box at the bottom.

NOTE: In all the editing forms, if you see a button above a column, you need to click that button to enter the field or to use a pull down menu (such as SPECIES CODE and NAME).

7. ADDING SPECIES TO LISTS.

Adding a new species to a list in **Data Entry** is easy. You will see an **Add Species to List** button in the Edit Menu and there is also an **Edit** button next to the **Select Species List** buttons inside the Catch Entry form. Clicking these buttons gives you the option of adding species to any of the Standard or Complete lists. You can also add a species to the polycorder list.

AT THE END OF EACH LEG

Your latest backup disk can be brought home directly as data disks. You can run the backup process again for a duplicate set of disks for safety. The backup data consists of all files named xxxx.bak in the C:/DATA/BACKUP directory.

The Data subdirectory will be cleared for the next leg, so for an additional backup, you can copy all your length files and the .BAK files from C:/DATA/BACKUP into the C:/DATA/LEGx subdirectory appropriate for your leg.

ANALYSIS DATABASE

A separate database, named ANALYSIS.MDB, is available for running queries and manipulating the data. ANALYSIS.MDB is simply an empty ACCESS database with the DATA_ENT.MDB tables *attached* to it. This attachment is set up so that you cannot change the data in the attached tables. The advantage of ANALYSIS.MDB is that you can write, edit and modify your own queries and tables with no danger of accidentally changing anything in the DATA_ENT.MDB database. The attached tables can be used in any query or macro as if they were actual ANALYSIS.MDB tables, except that you cannot add or change the data in them.

The ANALYSIS database also has a feature to import HAUL data. You will need to copy the XXXXX.HDB (where XXXXX = vessel and cruise) file from the bridge computer to a diskette and carry it to the data entry computer. Place the diskette in the data entry computer and open the ANALYSIS database. Open the MASTER form and click on IMPORT HAUL DATA. This function will only accept data from a floppy disk in the A: drive. Upon completion, you will have full database access to your haul data.

It is strongly recommended that you use this database for all data queries and analysis which are not built in to the Data Entry MASTER form.

DATA CHECKING

The Data Editing database has now been incorporated into the regular database. Usually, this section is used only after each leg for final editing, but can be used at any time if desired. This section should always be used sequentially: First **Check table relationships**, then **Analyze Catch Data**, then **Analyze Length Data**. The sequence is important, because subsequent checks assume that the errors found by a prior check have been corrected. Specimen analysis can be done at any time. Note that you will **NOT** need to **Import All Data** to use these analysis sections while at sea.

Within **Analyze Catch Data**, buttons should also be clicked from left to right sequentially, first **Check Catch Calculations**, and then **Check Catch Outliers**. Likewise, **Analyze Length Data** should also be used sequentially, first **Compare Raw Length numbers to Length frequency**, then **Compare Catch numbers to Length Frequency** and finally **Look for Length Outliers**.

Each of the forms will permit you to edit data from any haul presented in the table. Simply click on the row you want to edit and click the **EDIT** button and the appropriate catch or length edit form will appear. After you have edited your data, you should use **Data Checking** again. The Length outlier form also has a toggle button to filter the data. You can look at the whole data set or only at the outlier data.

TROUBLESHOOTING PROBLEMS

POLYCORDER PROBLEMS

ON DECK / DATA EDITING:

DISCREPANCIES IN ESTIMATED WEIGHT

If the estimated weights and catch weights differ by a large amount, the following are the most common reasons:

Failure to change species codes, or the same species code used twice (once incorrectly)..

Solution:

Look for pairs of discrepancies, one high and one low or absent. If there was a failure to change species, it may be difficult to figure out where the error occurred. Two good clues are differences in species lengths (a large species measured before or after a small species), and alternating male/female codes.

Use **Edit Length** to examine and edit all the polycorder files.

Random "big length" barcode misread. You may find a fish with an abnormally long length, caused by a misread of a barcode. These can increase the estimated weight noticeably, especially for small species. Many of the egregiously large values will be flagged by the **Length Summary** form after downloading the polycorders.

Solution:

The problem will be flagged in **Length Summary**

Use EDIT to examine and edit the incorrect polycorder file. In the case of random "big length" entries, the best solution is to delete the record containing the error. Remember that this changes the count of fish. For most sample sizes of 100 or more, this is an inconsequential error, but if there are few fish, you should make a note (+1) on the catch form and add the fish to the numbers column when entering data. Note that the Catch Entry program waits for your response when it automatically fills in a number in the numbers field; this is your opportunity to type in a different number if necessary.

POLYCORDER DATA "DISAPPEARS"

Occasionally it will appear that all the data you have collected has "disappeared" from the polycorder; when you look at the length data, it has started with line '1' again and all values are '0'.

Solution:

The polycorder can collect data for more than one "Haul", so when you are at the HAUL level (just after pressing "Collect Data" from the main menu, or "ESC" from the length data level), you can scroll down with the arrows to a new line, which will look like this:

HAL

56	<--- This is your correct haul number
0	<---- This is a bogus haul, which <u>can</u> receive data.

To retrieve your data, simply scroll the arrow up until the cursor is next to the real haul number, and then press ENTER. Your data will be just as you left it.

NOTE: This extra "Haul" can cause problems with downloading. If you have a polycorder with this error, download it last. Also make sure that the cursor is pointing to the right haul number before you download.

Although data can be collected from several different hauls in this way, you will not be able to download it without major problems. Avoid using arrow keys in the HAUL level.

FREQUENT RANDOM HIGH LENGTH ERRORS OR POLY CORDER JUMPS TO THE WRONG COLUMN AT THE WRONG TIME

Pay careful attention to the "error" beeps on the polycorder. Sometimes you will only have to re-enter the value, but in some cases the beep indicates that you have moved to a new field or line. Many complicated problems can be eliminated at the source by checking the next few length entries for correct data after an "error" beep has been heard.

If errors seem to be happening at an increasing rate, it is likely that the measuring boards are getting scratched and/or delaminating. Dirty or heavily slimed boards can also cause this problem.

Solution:

Check all length boards and remove damaged lamination or replace the length strips with undamaged ones. The main cause of strip damage is large rockfish like roughey, shorttraker and blackgill rockfish, whose large head spines can ruin a strip in one haul. Try to handle these fish carefully to extend the life of the boards.

If the boards look OK, they probably are, and frequent wash-downs may help eliminate the problems.

SPECIES CODE PRINTS OUT AS ZERO OR OTHER ANOMALIES FOR A NEW SPECIES ADDED TO THE POLYCORDER LIST

There is probably a problem with the polycorder species list. Refer to "Incorrect Species Codes", page 18 of this manual.

SOME POLYCORDER SEEM TO HAVE WEAK BEEPS

The volume of the polycorder beeps is not programmable, like the frequency and duration of the sound is. There appears to be considerable difference in volume between different polycorders.

Solution:

There is no solution to the volume problem, but it may be mitigated by experimenting with the frequency and duration of the beep. Some tones are more readily heard over ship noise than others. Note that if the duration of the beep is extended too much, speed of data entering may be affected.

DOWNLOADING POLYCORDERS:

FORGOT A POLYCORDER

Sometimes you may realize that you have two or more polycorders to download only after you have downloaded one and exited the download program. You can download another polycorder at any time; **Data Entry** will combine the added data with any other data previously in the database to produce a new printout of total length frequency.

EDITING POLYCORDER LENGTH DATA

1. IF CATCH HAS NOT BEEN ENTERED:

On the MAIN menu, click the EDIT button to get the EDIT MENU. Click on EDIT LENGTH, and enter the haul number.

A new printout will be generated at the completion of accepting the data in Length Summary.

2. IF CATCH HAS ALREADY BEEN ENTERED:

Edit the polycorder data using Edit Length as described above.

Note that the LENGTH table in ACCESS contains frequency and not raw data, but you will always be editing the RAW DATA, which is presented in the Editing form in the same order as it appeared on the polycorder. **Data Entry** will recalculate and update both the LENGTH and RAW LENGTH files when you exit Length Summary

REMEMBER, it is much easier to fix polycorder errors before entering the catch data.

TIPS FOR CATCH ENTRY

Occasionally, **Catch Entry** will run into an error that results in the user being dumped into a code window. Do not panic. This may necessitate re-entering the data you are currently working on, but a few rules will prevent damaging or corrupting the data in the database. First, note the line of code that is highlighted on the screen and try to describe the conditions that caused the problem so it can be looked at back in Seattle. Then close the window by clicking on the "X" (standard Windows close window icon) in the upper right hand corner of the screen. The program will warn you that the code will be terminated, click OK to all questions. If you return to the **CATCH FORM**, click the Quit button, and EXIT WITHOUT SAVING. Then EXIT ACCESS. If you have had more than one weird problem where no error occurred before, CLOSE WINDOWS 95 and restart the computer.

The golden rule for problems in ACCESS is to ALWAYS close down ACCESS completely after a program problem or error, and then restart it.

Repetitive errors in one session or errors with negative error numbers ("Reserved error -2234", for example) indicate problems in WINDOWS 95. Close down Windows and start the computer again. If this solves the problem, you do not need to record the problem (there is no programming problem to solve). If you get a message about a corrupted data base after restarting ACCESS, simply answer OK or YES to the question about repairing it. ACCESS does a good job of repairing this type of problem automatically.

Appendix K. (page 12 of 22)

Data entry tips:

It's a good idea to use a single click to press buttons throughout the **Data Entry** program (this is not true in Windows in general, which is very inconsistent). Do not start entering data until the form has opened, or you may have unpleasant surprises.

The default setting is for **MULTIPLE** baskets, which uses a pop-up window to collect multiple weights and numbers and sum them. This is the only mode which will allow you to enter [NON-SUB] weights. When you have entered all data with multiple baskets and [NON-SUB] values, you should switch to **SINGLE** basket mode, which is much faster.

The program will not stop in or allow you to edit the summary columns, combined weight and numbers and average weight; you cannot modify the [SPECIES CODE] column either. It is completely linked to the [SPECIES NAME] via the drop-down menu for selecting species. If you want to change the species name, click the arrow next to the [SPECIES NAME] combo box and the menu will appear.

It is important to turn off MULTIPLE baskets when editing data in the catch form, in addition to being annoying, you can get unexpected behavior if it is left on while scrolling around on the form. Change to SINGLE basket mode whenever you leave the current new record to edit another line.

DROP DOWN SPECIES MENU

There are two annoying bugs in ACCESS affecting the drop-down species menu. The first is a tendency for the window to drop down and then close with a blank, especially when you are entering data quickly. To re-open the window, click on it with the mouse and it will drop down again, or click on the small arrow to the right of the box. The second annoying bug, if you have a selection partially typed in the drop-down list, it will usually not let you change to a new list until the list cleared, and you will get a message saying the "The selection you type must match the list", You will need to press the <ESC> key one or two times to clear the current selection before changing lists. Most of the action of the drop-down menus is not programmable, so we will have to live with these annoyances for now.

It is very difficult to move around the Catch Entry form while **MULTIPLE** basket mode is on. If you need to edit data, switch the mode to **SINGLE** basket to move to the field you want. If you need to re-enter a large number of baskets, switch back to **MULTIPLE** basket mode when you have placed the cursor in the correct field. You can move through the data with arrow keys or the mouse.

DELETING DUPLICATE SPECIES (RECORDS WITH THE SAME SPECIES CODE)

-Error Message: "The changes you requested to the table were not successful because they would create duplicate values in the index....(etc.)."

This message occurs when you try to enter a record which has the same [Species Code] as a previous record in the same haul. This event is annoying to deal with, but understanding how ACCESS works may help clarify why the program acts as it does.

ACCESS treats the data you are entering as potential candidates for inclusion in the database. As you enter the fields (columns) you see them on the form, but they are not included in the database (actually a temporary table at this point), until you "commit" them by moving to a new line. Whenever you reach the end of a record (either [Subsample Weight] or [SAMPLED ALL?], depending on the type of split), the form automatically moves to the next line and commits the record to the database. Similarly, whenever you move out of the current record with an arrow key or mouse, whatever data is in the record at this point gets committed to the database. This means that ACCESS must resolve any verification or key conflicts before it allows you to leave the line. If any field requires a

Appendix K. (page 13 of 22)

value (like [SAMPLED ALL?]) or if there is a key conflict in any of the fields, you are stuck in that line until you resolve the problem. In order to maintain the integrity of the database, the [Species Code] field is a key field and cannot contain duplicate values.

Note that you are always working on a line that has a little "pencil" illustrated at the far left hand (non-data) column. If you move around the data, you will be followed by a little arrow in that column indicating which record you are in. Clicking on this cell (on the little arrow or pencil) selects the whole record for processing. Normally, you can highlight this cell by clicking on it and hit the <DELETE> key and the record will be deleted after prompting you. This will not work if you have a key conflict, which is an annoying feature of ACCESS, but one we may have to live with.

Solution:

If you get stuck in a record and want to delete it, you must resolve all conflicts. This includes filling in all required fields and eliminating key duplicates. The fastest way to do this is to enter fake data satisfying the conditions and then deleting the field. If you are required to have a [SAMPLED ALL?] value, fill in an arbitrary "y" or "n". Click on the [SPECIES CODE] cell (far left data field) and fill in any arbitrary species that you know has not been entered into the database.

You have now made the deus ex machina happy and can delete the record as described above. Alternately of course, you could delete the previous duplicated record at this time, but you will have to re-enter the correct species code on the edited line again.

Remember, after all this work, to edit the data properly to reflect the combination of weights from the two entries (assuming that they were two separate legitimate entries and not the same basket entered twice).

SAMPLED ALL COLUMN

The [SAMPLED ALL?] column is automatically filled in with the values according to your answers to the fields listed in the table below:

[Subsample type]	[Same Proportion?]	[SAMPLED ALL?]
1	(not required)	Y
> 1	Y	N
> 1	N	(enter for each record)

NOTE: When editing a catch form, if you enter a different subsample type, the program will generally automatically fill all the [SAMPLED ALL?] fields with the correct value as contained in the table above (except for the last case, where you will have to edit each line correctly by hand to reflect the data). This update will not occur until you leave the header and start working on the catch data values.

DATABASE PROBLEMS

REBUILDING A DAMAGED DATABASE

If the ACCESS database is damaged beyond repair, or if you suspect that considerable uncorrectable corruption of the data has occurred, you will need to use your backup data to create a new data entry ACCESS database.

To reset the database, copy the damaged database (C:\DATA\DATA_ENT.MDB) into a subdirectory of your choice, just in case it is of any use in the future. Renaming DATA_PROBLEMS.MDB or similar may be a wise idea. Delete the file C:\DATA\DATA_ENT.MDB. Copy the empty database DATA_ENT.MDB from the C:\DATA\EXPERT subdirectory back into the C:\DATA subdirectory. Rest the cursor on your new database file and click the right mouse button while your new database file is highlighted to bring up the file menu, and click **Properties**. You need to UNCHECK the box that says **Read-only** (ONLY ON THE NEW COPY YOU JUST MADE!). The original is made read-only so that no modification can be made to it while it sits in the C:\DATA\EXPERT directory.

Next, copy your most recent good backup into the C:\DATA\BACKUP directory. Compare the dates/times of the file on your backup floppy disk to the files already in the BACKUP directory, to ensure that the floppy disk files are more recent than those in the BACKUP directory. If the floppy disk represents your best set of data, copy all files with the extension .BAK into the C:\DATA\BACKUP directory.

Next, start the **Data Entry** program from its icon, which will bring you back to the standard **MASTER** form. Click on **DATA CHECKING** in the lower left hand side of the form. Then click on **Import all data**. All your data will automatically be imported and placed into tables.

When you are done, the database will contain exactly the same data it did at the time of your last backup. Check the Summaries forms (click **SUMMARIES** on the Main Form) to see what data already exists in the database. You will need to enter all data collected after your most recent backup again. This will require entering the length data from the printouts using the **ENTER LENGTH** (manual length entry) button.

INCORRECT SPECIES LISTS

Normally, your version of the DATA ENTRY program will be customized to your survey. Occasionally you may find yourself at sea with a program that obviously has the wrong catch species list (you can't find fish common to your survey in the standard and/or complete lists), or the wrong polycorder list (the length printout will have the wrong fish associated with the polycorder species number). There is a database in the C:\DATA\EXPERT directory to correct these problems, SPLST.MDB. Open ACCESS from WINDOWS, (or start up Data Entry from the icon, and then exit the Main Form by clicking the small (lower) "-" in the upper left hand corner of the screen). You will be in the main ACCESS window, which defaults to the **TABLES** list. Scroll down the list (or you can type the first letter of the table to get in the general vicinity) until you find the problem table **SPECIES_LIST** for the Catch species lists, or **LENGTH_WEIGHT_PARAMETERS** for the polycorder list.

Rename the table to something like "PROBLEM_splst_standard" etc. (just in case things don't work out, you still have the original list). Write down the original name of this table, you will need to remember it for the following steps. Renaming anything in ACCESS uses the same procedure: highlight the table (or other item) with your mouse by clicking ****once**** on it. Then while it is highlighted, click the first main menu item **File** at the upper left hand side of the screen. Choose **Rename...** from the drop-down menu OR right click while the table is highlighted and a menu including **Rename...** will appear. After you click on **Rename...**, A box will open for you to type in the new name.

Now click on the icon that looks like a folder (second from the left on the second menu bar), or open **File** and choose **Open Database...** You will have to navigate around to the C:\DATA\EXPERT directory, where you will see SPLST.MDB is available. Select this database.

SPLST.MDB contains all current species lists for all surveys. Select the appropriate one (for example SPECIES_LIST_goa, or LENGTH_WEIGHT_PARAMETERS_bs), and click on **Edit** on the menu bar and select **Copy**. This places the table into the windows clipboard. Follow the instructions above to open a new database (you don't have to close the current one yourself, ACCESS will close the current database automatically before loading a new one), this time returning to C:\DATA to select DATA_ENT.MDB. When this database is open, click on **Edit** on the menu bar and select **Paste**. You will be prompted for a new name.

Use the original name of the table you

renamed at the first step above, and NOT the one with the survey extension. If your problem file was LENGTH_WEIGHT_PARAMETERS, and you started by renaming this PROBLEM_LENGTH_WEIGHT_PARAMETERS, the name of your new copied table will be LENGTH_WEIGHT_PARAMETERS. This is important, since the Data Entry program is expecting the old name, not the name from the SPLST.MDB database. You will now have replaced the old, incorrect version with the appropriate one for your survey.

NOTE: If only one species appears to be incorrect in the LENGTH_WEIGHT_PARAMETERS table, you can correct it directly by opening the table in ACCESS and editing the table directly.

(RE)INSTALLING DATA ENTRY PROGRAM

DIRECTORIES:

C:\DATA

ANALYSIS.MDB
DATA_ENT.MDB **

C:\DATA\EXPERT

DATA_ENT.MDB **
DATAPLUS.EXE
MACEMEM.695
MEMORY.198
SPLST.MDB

*** Note that DATA_ENT.MDB is copied into both C:\DATA and C:\DATA\EXPERT*

INSTALLATION:

To install Data Entry, create the subdirectory **C:\DATA** and under that, the two subdirectories **C:\DATA\BACKUP** and **C:\DATA\EXPERT**. Copy all files as listed above into the appropriate subdirectories.

CREATE ICON FOR DATA ENTRY:

Find **C:\DATA\DATA_ENT.MDB** using Windows Explorer or My Computer. Highlight the file name (don't double click, or you'll start it!), and then right click on the mouse. From the pop-up menu that appears, click on **Copy**. Now position your cursor onto the main Windows Desktop (where all the other icons are) and once again right click on the mouse. From the pop-up menu, click on **Paste**. An icon will appear on the desktop. You only need to click on this icon to bring up the **Data entry** program.

CREATE ICON FOR THE ANALYSIS DATABASE:

Repeat exactly the steps under "CREATE ICON FOR DATA ENTRY" again, except choose **C:\DATA\ANALYSIS.MDB**.

POLYCORDER MANUAL

MAJOR DOS AND DON'TS FOR THE POLYCORDER

DO:

1. **Press the "Download polycorder" button in the Data entry program on the computer before starting the polycorder transfer. It should say "Downloading polycorder" before you start the polycorder transfer.** Very unpredictable results and possible data loss can occur if you start the polycorder transfer before the "polycorder transfer" routine is waiting.
2. **Download the polycorder after each haul.** The current programs cannot deal with multiple hauls.
3. **Watch the polycorder screen while changing species and sex.**
Errors resulting from auto-copying faulty data is very hard to correct after the haul is over.
4. **Line the fish up between the bar codes.** Measuring the fish while it is covering even or odd codes will lead to bias in the data, since you will unconsciously read the closest bar code to the fish.
5. **Enclose the polycorder in a plastic bag so that there is complete waterproof protection for the RS-232 connector on the top.** The polycorders are sealed, but the port can be damaged by saltwater.
6. **Always keep the adapter cable on the polycorder.** The adapter cable protects the permanent RS-232 port on the polycorder. If the adapter gets damaged, use the spare from the polycorder case, and let Seattle know to make up a new one.
7. **Mark any damaged or problem polycorders clearly with a label providing a description of the problems.** This will distinctly tag bad polycorders and facilitate repair.
8. **Spray the RS232 connectors with contact cleaner (NOT WD-40!) periodically.**

DON'T:

1. **Don't press hard on the light pen.** The pen will work best with no pressure. If the pen repeatedly fails to read the code, rinse the length board.
2. **Don't leave the polycorder unused while in data collection mode.** Move back to the "Haul" window, since the light pen will then turn off.
3. **Don't use the "ERASE APPLICATION" feature.** It is password protected, but don't fool with it anyway.
4. **Don't erase anything that requires a password to erase.** Erasing data does not require a password.
5. **Don't use a chipped bar code pen.** The major cause of damage to the length strips is scratching from the bar code pen. Spare tips are available in the polycorder case. Use silicon sealant to seal the joint between the pen and the tip when you replace it.
6. **Don't disconnect the barcode pens or interface strips with wet or slimy gloves.** It is essential that the RS-232 port remain free of moisture and salt.

COLLECTING DATA WITH THE POLYCORDER

In the following instructions the "<>" symbols will always be used to designate a polycorder key and "{}" will designate a bar code on the length strip. For example, the escape key is designated <ESC>, and the bar code for "Sex" is designated {SEX}.

Using the polycorder keypad.

The keypad on the polycorder is like an enhanced numeric keyboard. Hitting any key will enter the number marked on the key. To enter alphabetic characters, use the <SHF> key to choose the proper letter. For example, the "5" key has the letters "M", "N", and "O" on it. To enter a "M" you would press <SHF> <5>, and to enter an "O", you would enter <SHF><SHF><SHF> <5>. After trying this a few times, you will be glad that under normal circumstances, you will not have to enter any alphabetic characters.

The <ON/OFF>, cursor control and <Enter> keys are self explanatory. The <ESC> key will normally bring you up to the main menu area.

Note that a <SHF>, "cursor key" will move you ten lines in the direction of the cursor, which makes this a fast way to travel through a file on the polycorder. <SHF><SHF>"UP" will bring you to the beginning of the file, and <SHF><SHF>"DOWN" will go to the end of the file.

Password

In order to ensure that applications are not accidentally erased instead of data, a password has been set on all application functions. This also affects any use of the MODE functions. Simply type an <A> (that's a <Shift><7>) at the password prompt.

Do not ever erase anything that requires a password, unless you know exactly what you are doing.

Starting polycorder.

Press the <On/Off> button to turn polycorder on. Press <Enter> until you get to the main (Length) menu. Press <0><Enter> to start data collection. The first screen is a header file to collect the haul number. If a haul number is present, you need to erase the previous data. (Press <ESC> and choose <2><Enter>: see Erasing data). Enter the haul number and <Enter>. From now on, you will use the barcode wand to enter all data.

Entering data.

Read the polycorder species number from the species list. (For example, Pacific halibut is number 4). Use the wand to enter the length {4} from the length frequency board. You will hear a single beep. Next, choose the sex you wish to measure from the length barcode corresponding to standard RACE sex codes ({1} = male, {2} = female, and {3} = unsexed). You will again hear a single beep. You can now begin measuring fish. For each fish, read the barcode that overlaps the fork length of the fish. Keep the fish centered between the two rows of bar codes to eliminate selection of odd or even codes (see Important; below). The polycorder will beep three times for each successfully entered length. Note that species and sex are automatically duplicated each time a length is entered.

To change sex:

Enter the {SEX} code from the length strip (this moves the cursor to the left, or onto the sex column)

Enter a new sex from the length strip.

(Alternate method):

Enter the {SWITCH} code from the length strip (this changes the data as follows:

MALE (1) -----> FEMALE (2)

FEMALE (2) -----> MALE (1)

UNSEXED (3) -----> MALE (1)

This new method should save time.

change species:

Enter the {SPECIES} code to change to the species column)
Enter a new species code using the method described above.
After the beep, the cursor will automatically move to the sex column.
Enter sex as previously described.
You are now ready for the next species.

Note that you can also completely navigate throughout the data by using the {L}, {R}, {U} and {D} bar codes to move the cursor Left, Right, Up and Down, respectively.

Note: Use the jumper cable with the bar code wand, since the connectors will fit better. The bar code wand connectors fit poorly on polycorder port.

EDITING DATA IN THE POLYCORDER

Occasionally, you will make an error that will require you to correct data while on deck. Use the cursor movement bar codes to move around, and normal bar codes to change data in each column.

You can also navigate throughout the data using the keypad. If you use the keypad, wash your gloves before using the keys, to keep the polycorder clean and slime free.

You can not eliminate a line from the polycorder record, so if you are not going to use a line, just enter a "0" length in the length column. The downloading program simply ignores the whole line if the length is 0. Don't leave a line with a "0" species and a real length; change the length to zero too.

Once you move the cursor into the species or sex columns, the autocopy feature is disabled and you can move freely among the columns. When length is entered, the autocopy feature is re-activated.

The polycorder remembers the last species and sex entered to autofill the columns. It is important to remember that if you move "up" (i.e. lower record numbers) in the data records, the polycorder will still remember the last species and sex entered, and will autocopy these into the new area you are editing, if you enter a length. You will not have a problem if you use the arrow keys to enter data only in the species and sex columns. Carefully monitor the data if you need to edit lengths, and reenter the species and sex. After this the autocopy feature will use the newest values to copy.

If you have extensive editing to do, it may be a better strategy to use the editor feature available during the polycorder download process. Make notes of line numbers to edit, and correct them later on the PC.

Ending entry session.

When measurements are completed, press the <ESC> key (twice) and <On/Off> to turn the polycorder off. The laser in the wand stays on the whole time the cursor is in a data column, and will drain the batteries if the polycorder is left on. [Pressing <ESC> once to enter the "Haul" header window will turn off the light, and still allow quick access to the data; **let the polycorder rest in the Haul window whenever you need to stop using the polycorder for an extended period of time during a length measurement session**]. Stow the wand in a safe place. The cord on the wand will allow it to fall completely to the deck if dropped. These wands are expensive, and need to be treated carefully.

DOWNLOADING DATA FROM THE POLYCORDER

Remove the RS-232 connector to the bar code wand and replace it with the RS-232 connector to the PC serial port (this must be a NULL MODEM cable).

Start the Data Entry program from the icon in Windows on the data entry PC.

Press the **Download polycorder** button on the MAIN menu. Turn on the polycorder, get to the Length menu and select option number 1, Transmit data. Press <Enter><0> (Standard transmit). The polycorder is now standing by to transmit.

The program will ask you to press any key when ready. If the polycorder is on standby (as described above), you are ready. Strike any key on the PC, and then press <Enter> on the polycorder. Don't press the enter key on the polycorder before the PC is ready. You should see data scrolling by on the computer screen.

Appendix K. (page 20 of 22)

The program will ask if you want to download another polycorder. If you are finished, enter "n", and your data will print out.

If you wish to download another polycorder (SAME HAUL ONLY!!), enter "y", and you will be asked to strike any key when ready. This gives you the opportunity to change cables between polycorders and put them in stand by mode.

Carefully examine the printout to see if the data appears to be correct and complete. If the download program terminates abnormally, note the error message. You may need to edit the data on the polycorder to get a good download. Blanks or character data in an integer field could cause download program errors. Correct these using the cursor keys on the polycorder (in "Collect data" mode), and try the download again.

The transfer program will warn you if you already have data in the database under the same haul number. If this happens, you will need to check the haul numbers of your current length data in the database and edit if necessary.

Data checking:

The polycorder system eliminates the time needed to transcribe data from forms to the computer, but it requires some extra attention in data checking to detect errors inherent with this system. Someone should compare the printout to the catch form immediately after dumping the polycorders. Many of the problems associated with forgetting to change sex or species while collecting data are only correctable soon after the haul. This will catch errors while the order of data collection is still fairly clear in people's minds. Also check for suspicious trends like a single recorded sex for species where the sexes are equally common, and abnormally large numbers of one species, which may indicate that the species number wasn't changed between species. The LENGTH SUMMARY form, which is presented after polycorder downloading, will help in this analysis.

Also note the instructions for CATCH entry in the main manual for information on how estimated weights from the length data is used to check the recorded weights on the CATCH form.

Please report consistent problems or any other helpful comments to Robin after the cruise.

Erasing data:

Do not erase the data on the polycorder until you are absolutely sure that the data in the database are correct. Once erased, the polycorder version of the data is permanently gone. It is probably a good idea to erase the data just prior to collecting data from the next haul.

To erase the data:

Get to the Length Menu (usually by pressing <ESC> from whatever your current mode is).

Cursor to or enter <2><Enter>

to get into the erase data mode.

Enter <SHF><Y> (on the "3" key)

to answer the question "SURE?".

You will hear a series of beeps and the data will be erased.

Do not choose <E>. Erase application from the main menu! If you erase the application you must reset the application on the polycorder. Trust me, this is not something you really want to do. (If you do accidentally erase the application, you will need to reload the polycorders memory, see page 29.)

MAINTAINING THE POLYCORDER

Checking the batteries:

Check the polycorder batteries frequently. To test batteries, insert the "BATTERY TESTER" RS-232 port onto the polycorder. Press <4> "Check battery" on the main menu. After a moment, the current voltage will appear on the screen.

Appendix K. (page 21 of 22)

The maximum voltage is about 8.4 volts, and normal operations will occur between 7.0 and 8.0 volts. Recharge the polycorder when voltage drops below 6.8 volts. It is important to let the polycorder batteries drain as much as possible before recharging. The Ni-Cad cells will operate best if drained before recharging. Do not recharge the polycorder if the voltage is above 7.0 volts.

Note that the polycorder Manual section on charging batteries does not have the correct instructions for testing batteries. Use the method described here.

Recharging the polycorder:

The polycorder will take four to six hours to recharge, so charging overnight is the most practical option. You can probably recharge it enough in a half hour to allow downloading of data if the batteries have reached minimum charge.

If a polycorder seems to have a very short useful life on deck, try the following before replacing the Ni-Cad pack: Drain the Ni-Cads completely by leaving the polycorder on overnight in the data collection mode (bar code wand ON). After the unit is completely drained of power, charge it for eight hours. In almost every case, this will restore an apparently faulty battery pack.

If this procedure fails after several attempts, a spare battery pack is available in the polycorder case. Open the polycorder shell by removing six screws in the back of the unit. Remove and save the old pack and insert the new one, taking extreme care not to pinch the battery cable between the case and the battery holder (we have had this cause a short in the past). Carefully re-attach the back plate, making sure that the O-ring seal is seated well, and replace the screws. These screws should be snug, but not extremely tight (the top pair in particular should not be over tightened - the seal at the top should not be more compressed than the seal around the bottom side). Recharge the polycorder for eight hours.

NOTE:

If your polycorder loses its programming (all you see when turning it on is “**Mode?**”, reset it according to the instructions below. **Keep a close eye on this polycorder; if it loses its memory for a second time, it may indicate that the lithium backup battery is dead.** If a polycorder is used with a dead lithium battery it will lose all data if the NiCad batteries go dead on deck! Normally you can download a “dead” polycorder because the lithium cell keeps the memory alive until the NiCads are recharged. Polycorders with a suspected dead lithium cell should not be used until the lithium cell is replaced, which requires opening the case and soldering a new one in. Do not attempt this if you have not been instructed how to do it ahead of time.

Important:

We have found that some users have a tendency to use the innermost bar code most of the time. Since the innermost codes are even lengths, you can check the data by looking at the length frequency output for a species that is numerous in the catch. These may show distinctly high frequencies for most even lengths and depressed frequencies for odd lengths.

It is important to develop a lengthing technique that avoids this tendency. One method is to put the fish directly in between the sets of bar codes and then determining which code mark the fish overlaps. There is only a tiny space between even and odd codes, and most fish will overlap one.

One of the potentially disastrous errors on the polycorder may occur when changing species and/or sex. If you mistake the number of beeps (which is very common when two polycorders are going at once, or when the hydraulics are loud), you can start to enter data in the wrong columns. Since species and sex are automatically repeated, a nonsense code can be repeated throughout a data column. This may be nearly impossible to correct once the fish are thrown away. For this reason, we recommend that you **always look at the screen after making a species and/or sex change, to confirm that the data are correct.**

SOLVING TECHNICAL PROBLEMS FOR THE POLYCORDER

Reloading memory onto the polycorder.

If the polycorder program becomes corrupted, starts to act strangely, or the "Dataplus" mode fails to come up at all (you only see **Mode?** when you start the polycorder), it is time to reload the memory. If there is any question of the program acting strangely, just go ahead and reload the memory. It can't hurt the polycorder, and will probably fix your problem (but see the note below about downloading all data from the polycorder first). See the section on replacing the backup battery, if there is a possibility that the battery has failed.

Make absolutely sure that you have downloaded all the data you want from the polycorder, since this method will erase everything.

Use Windows Explorer or My Computer to locate **C:\DATA\EXPERT\dataplus.exe**, and double-click it to get it started.. Once the program starts, type in <C>, then <S>. Use <F2> to locate, or just type in the file name "MEMORY.198". (Use MACEMEM.695 ONLY for the 448K polycorders which MACE uses). Dataplus should tell you it is ready to send and is waiting for a signal from the polycorder. On the polycorder, enter a <M><Enter><A><Enter><3><3>. A long stream of memory will dump onto the polycorder. The file transfer may take a long time, but you will see a stream of data scrolling down the screen as it downloads. Check the application carefully after using this method to see that everything is OK. This method essentially replaces all memory in the polycorder with a memory image created at the Center, which should be identical to the polycorders when they left the Center.

To change the default "beep" tone for autocopied columns:

There are two different beeps available for the polycorders, so multiple users do not get confused by sounds from another polycorder. The tone length and pitch are maintained in a program called "SNG1".

To change the data entry tone, hit <M><Enter><A><1><3> to get to the edit program list. Use the <L> and <R> keys to find "SNG1". Hit <Enter> when you see "SNG1". Use the <R> key to get the PARAMETER screen, which should have a number like "50,5" on it. Enter a new value for pitch and length separated by a comma. Higher numbers are higher in pitch and longer in tone. An example would be 60,5 which would be a 60 tone (medium high pitch) and length 5 (relatively short). The comma is <SHF><SHF><0>. Hit enter after entering the numbers and <ESC> to leave this mode and the change is automatically entered.

Since there are two tones in the SNG1 file, you need to edit lines 1 and 3 to change both tones. You can even set the tones to different pitches. The default tones are 40,5 on one polycorder and 55,5 on the other.

If something goes wrong, or the polycorder fails to work properly, you will need to load "SNG1.PGM" from the computer back onto the polycorder, using the method described above. This will restore the original file and default tones.

Be very cautious in "Edit Program" mode. Do not change any other programs.

To change the standard beep tone (**This is not the data entry tone!**), hit <M><Enter><A><5><2> to get to the protocol list. Use the <L> and <R> keys to find "BEEP TONE". Enter a new value for pitch. Higher numbers are higher in pitch. You can also change the length of the BEEP by changing "BEEP TIME" in the same menu.

They lived happily ever after.

THE END

Appendix L. Pacific Cod Tagging form and shipboard instructions.

Pacific Cod Tagging Form

TAG NUMBER (C)	DATE	LENGTH	RELEASE LOCATION	ADDITIONAL COMMENTS
01				
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50				

Tag Number	Forms are pre-numbered with the last two digits that will appear on each tag. Fill in the first three digits from each tag used, making sure to keep tags in order.
Date	Date that fish was tagged and released.
Length	Fork length of fish being tagged and released.
Release location	List sequential haul number from haul where fish was released this information will be matched to the Skipper's logbook information at a later date.
Comments	Note anything anomalous about cod particularly if upon the release the fish looks as though it might be moribund..

Appendix M. Species list and NMFS Race Division species codes.

Species Name	Species Code	Species Name	Species Code
Alaska plaice	10285	dusky rockfish	30150
anemone	43000	eelpout	24100
<i>Aplidium</i> sp.	98310	egg case (snail)	71001
argid shrimp (unidentified)	66570	English sole	10170
arrowtooth fld.	10110	eualus shrimp (unidentified)	66170
<i>Asterias amurensis</i>	81742	eulachon	23010
atka mackerel	21921	flathead sole	10130
barnacle	65100	flatworm	92000
basket star	83010	fragile urchin	82530
<i>Bathyploides</i> sp.	85180	<i>Fusitriton oregonensis</i>	72500
<i>Bathyraja</i> sp.	405	giant wrymouth	23792
bay scallop	74104	great sculpin	21370
<i>Berryteuthis magister</i>	79210	green urchin	82510
big skate	420	greenland cockle	75285
bigmouth sculpin	21420	greenland turbot	10115
bivalve shell	99993	greenling (unidentified)	21900
bivalve shells	99993	hair crab	69400
black rockfish	30330	hairy triton snail	72500
blackcod	20510	halibut	10120
boccaccio rockfish	30400	harlequin rockfish	30535
box crab	69270	helmet crab	68781
brachiopod	97000	hermit crab	69010
brittlestar unid.	83000	hermit sponge	91016
bryozoan	95000	herring	21110
<i>Buccinum</i> sp.	72740	hippolytid shrimp (unidentified)	66150
butter sole	10270	humpy shrimp	66045
cancer crab (unidentified)	68010	hyas crab	69578
<i>Cancer oregonensis</i>	68040	idiot rockfish	30020
capelin	23041	jellyfish	40500
<i>Chlamys</i> sp.	74104	jingle	75605
chum salmon	23235	juv. P.cod	21721
clams	74000	juv. walleye pollock	21741
cockles	74981	kelp crab	69530
<i>Colus</i> sp.	71710	Kennicott's beringius	71770
coonstripe shrimp	66050	king crab (red)	69322
<i>Crangon crangon</i>	66502	king salmon	23220
crangonid shrimp	66500	left-hand welk	71755
<i>Ctenodiscus crispatus</i> (ninja star)	81780	light dusky rockfish	30152
<i>Cucumaria fallax</i>	85201	lingcod	21910
cuke unid.	85000	longnose skate	440
cuke unid.	85000	longsnout prickleback	23836
dark dusky rockfish	30151	<i>Molpadia</i> sp.	85115
<i>Dasycottus setiger</i>	21390	monster snailfish	22226
debris	99999	moonsnail (unidentified)	71525
decorator crab	68510	mussel	74050
dogfish	310	<i>Myocephalus</i> sp.	21375
dover sole	10180	<i>Myoxocephalus polyacanthocephalus</i>	21370
Dungeness crab	68020	<i>Neptunea</i> sp.	71800

-Continued-

Appendix M. (page 2 of 2)

Species Name	Species Code	Species Name	Species Code
northern rock sole	10261	sea pen	42000
northern rockfish	30420	sea potato	98082
nudibranch (unidentified)	71010	searcher	20720
octopus	78403	sharpchin rockfish	30560
Pacific cod (P.cod)	21720	shortfin eelpout	24191
Pacific Ocean Perch	30060	shortraker rockfish	30576
Pacific Sandfish	21592	shortspine thornyhead	30020
Pacific staghorn sculpin	21380	shrimp (unidentified)	66000
pandalid shrimp	66019	sidestripe shrimp	66120
<i>Pandalis borealis</i>	66031	silky buccinum	72752
<i>Pandalis goniurus</i>	66045	skate	400
<i>Pandalis hypsinotus</i>	66050	skate egg case (unidentified)	401
<i>Parastichopus californicus</i>	85020	sleeper shark (Pacific)	320
<i>Pentamera lissoplaca</i>	85169	smooth lumpsucker	22175
pink salmon	23230	snail	71500
pink shrimp	66031	snail eggs	71001
plain sculpin	21371	snailfish	22200
poacher	20040	southern rock sole	10262
pollock (walleye)	21740	spinyhead sculpin	21390
polychaete	50000	sponge	91000
pribilof neptune	71820	spot shrimp	66040
prickleback	23800	squid	79000
prowfish	24001	starfish	80000
<i>Pycnopodia helianthoides</i>	80160	starry flounder	10220
red irish lord	21346	Stearn's volute	72790
red striped rockfish	30430	sturgeon poacher	20040
red urchin	82520	sweet sea spud	85115
red-banded rockfish	30475	Tanner crab	68560
rex sole	10200	tomcod	21710
ribbed neptune snail	71870	tube worm (unidentified)	50010
ribbed sinistral snail	71755	tunicate	98000
rock sole	10260	urchin	82500
roughey rockfish	30050	wattled eelpout	24185
sablefish	20510	weathervane scallop	74120
saffron cod	21735	white-spotted greenling	21932
salmon shark	232	yellow Irish lord	21347
sand dollar	82730	yelloweye rockfish	30420
sand lance	20202	yellowfin sole	10210
sand sole	10250		
scallops (unidentified)	74100		
scallops (weathervane)	74120		
sculpin	21300		
sea cucumber	85000		
sea mouse	50160		
Sea peach	98205		

Appendix N. Temperature data logger instructions.

<u>Screen Prompt</u>	<u>Response</u>	<u>Comments</u>
C:\menu>	cd\dataogr	changes sub-directories
C:\dataogr>	xl	executes data logger software program
connect a logger and	(any key)	must turn off computer, is connect and reconnect the press any key probe each time you get into the program
Data in logger-dump first?	Y	dumps data from logger to computer RAM (screen memory)
Enter new string	D12%5.1f	O (for output) program defaults each time, must be reset to direct the output file as an easily readable format D prints dates, 12 readings per line, 5 spaces per reading, 1 decimal place.
Xfr data to/from file	x	Transfers data from RAM to a designated file
stored data	y	
Enter a File name	c:\data\wpfiles\060999.dat	Use A:\ or C:\ directs to the floppy disc or hard drive, name for date dumped with.dat (example) extension. (Name can be eight characters only plus a 3 character ext.

-Continued-

Write hexadecimal? n

Before quitting reset start and end of logging times and enable logger **L**.

q	quits the data logger session, now need to call up file in WordPerfect
C:\datalogr> cd\apps\wp5.1	change to WordPerfect subdirectory
cd\APPS\WP51	wp program executes WordPerfect c:\APPS\WP51
(blank screen)	F5 function key F5 lists files
Dir C:\WP51*.*	a: (enter) changes from the files in the WP51subdirectory to the files on the "a" drive, arrow key to the desired file
	1 retrieves the file
	F2 searches for a character string, enter desired starting date and press F2 again (starts search)
	F7 exits wordperfect

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